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THE

MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—11TH YEAR. SYDNEY: SATURDAY, AUGUST 30, 1924. No. 9.

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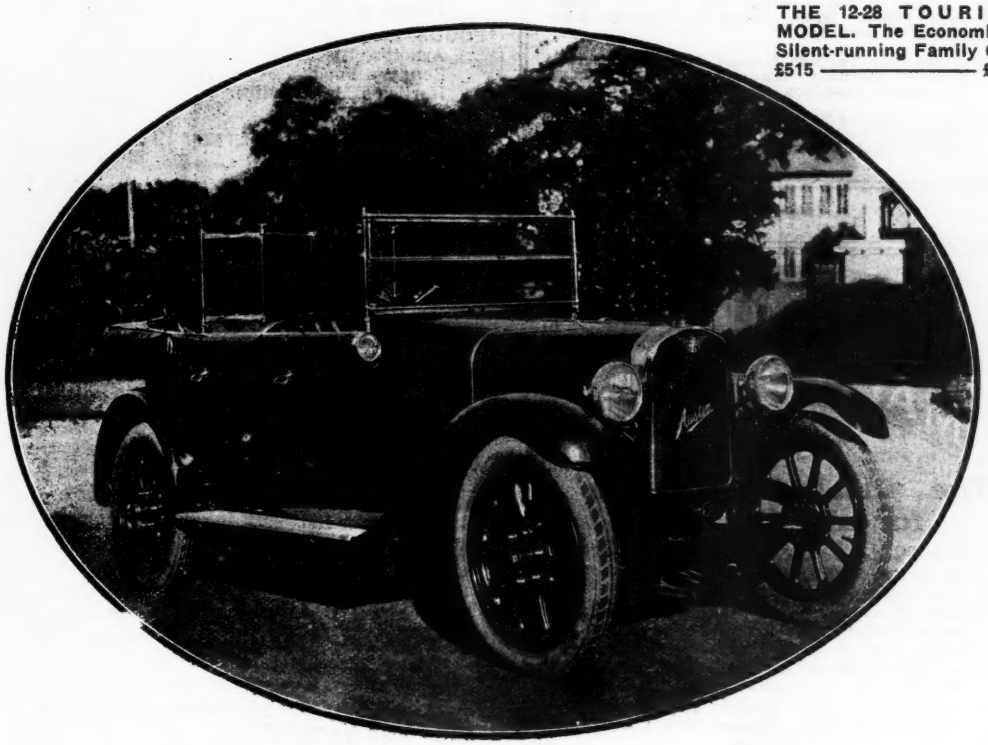

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NATIONAL HEALTH INSURANCE IN ENGLAND.

By ALFRED COX, M.B., B.S., Hon. M.A. (Durham),
Medical Secretary, British Medical Association.

WHEN the Editor of THE MEDICAL JOURNAL OF AUSTRALIA kindly asked me to write some articles on the work of national health insurance in England which should bring our experience to bear on the situation which has now arisen in Australia, I felt that to do so would be not only a privilege but a duty, for those responsible for British Medical Association administration here consider that your problems and your troubles are ours and we are always prepared to help you, just as we should without hesitation ask for your assistance on any point on which you had had experience and we had not. But I came to the conclusion that it would be impossible for me to deal with this question without repeating most of what I had said in a series of articles I wrote for *The Journal of the American Medical Association* and I hope that by this time the Editor has secured the consent of the editor of that journal to their reproduction and that they will be found useful.

I have nothing to alter in those articles. The opinions I then expressed I still hold, but I wish in this article to bring the information up to date and to emphaize some of the warnings I then gave. I have followed with great interest the articles on the subject of national insurance which have appeared in your journal and particularly the excellent *résumé* of the situation here which was given by Dr. Newman Morris in his article of March 8, 1924, on "National Insurance in Australia as Affecting the Medical Profession," the leading article in the journal of April 12 and the summary by Dr. Newman Morriss of the evidence given by certain medical practitioners in Australia before the Royal Commission on National Insurance. These show that the interests of the profession in Australia are being jealously watched by vigilant eyes and will be dealt with by competent hands.

Recent Alterations.

So far as our insurance system at home is concerned the main alterations since 1921 are as follows:

(*a*) There is now free choice of doctor by patient at any time instead of twice a year as formerly. The transfer can be made simply by taking the medical card to the new doctor. This alteration was made on the initiative of the British Medical Association because we are anxious, as far as possible, to assimilate insurance conditions to those of private practice. Having adopted national insurance

in this country we want the medical system to be a good one differing as little as possible from the best kind of general practice.

(*b*) In 1921 the capitation fee paid to the doctor, exclusive of drugs, was 11s.. It is now 9s. after a period of two years (1922-1923) in which it was 9s. 6d.. Those who have followed the controversy, fully reported in *The British Medical Journal*, will remember that at the end of 1923 the Government told us that they were prepared to offer 8s. for five years or 8s. 6d. for three years. We declined both offers and insisted upon arbitration and the arbitrators gave us 9s. for four years. I would emphasize the fact that this is the second occasion on which arbitration has been recognized by the Ministry of Health as the proper way of settling a difference between themselves and us. It has not been easy to induce a Government Department, accustomed to making final decisions, to admit that such decisions should be submitted to outside arbitration, but we have now established the principle and value it very greatly, for its application has enabled us to cut short periods of squabbling and press publicity which were not calculated to enhance either the dignity of the profession or the interests of the public.

(*c*) The Insurance Committees are now smaller in size than as described by Dr. Newman Morris. They were cut down in 1921 in accordance with the policy of all-round retrenchment. The proportion of doctors to the other members of the Committee remains as before.

It should be noted that as the only business of the Insurance Committees is to adminster medical benefit and they have nothing to do with other forms of communal medical service, these being adminstered by the public health authorities, the tendency is for these bodies to lose their interest for really capable and disinterested persons. The calibre of these Committees is not so good as it was and there is a tendency for the work to fall into the hands of the approved society representatives who, generally speaking, are the only persons (apart from the doctors) who have a direct interest in watching what goes on. Sanatorium benefit which covers the institutional care of insured persons suffering from tuberculosis, has been taken out of the hands of the Insurance Committees and transferred to the public health authorities.

(*d*) The maximum number of potential patients which any doctor can have on his list, is now 2,500 as against the 3,000 of 1921. This reduction was brought about by the Association as a reply to repeated criticisms about doctors having more responsibilities than they could fairly undertake. The average list is still in the neighbourhood of 1,000. It must be clearly understood that the list includes only the individual insured persons and not their families. It is important to make this distinction because I notice that your friendly society remuneration is for families and not for individuals.

(*e*) The responsibilities of the Panel Committees which represent the doctors engaged in insurance work, have been steadily increased and they are now a more important factor in the administration of medical benefit than ever before. This is in entire accordance with the wishes of the profession which has repeatedly asked for and obtained more and more influence in the government of the service. The latest power given to the Panel Committee, at the request of the Association, is to enable it to initiate complaints against insurance doctors who are not doing their duty by the service. Until this year the initiation of complaints could only come from insured persons and the Insurance Committee.

(*f*) The problem of how to deal with wasteful prescribing grows more difficult and the cost of drugs is increasing at a rate which is causing a good deal of alarm. Making all due allowance for the increased cost of drugs since the war and the increased payments to the dispensing chemists, it is found that the cost of the provision of drugs is increasing in a way which is mysterious. It is not due to greater incidence of sickness, because in some areas where sickness is no more prevalent than it is in others, the cost per head for drugs is much higher than in the others. It seems to be due to an insufficient appreciation by many doctors of the fact that economy is necessary. The Ministry of Health has made it plain that it does not desire any insured person to be deprived of any drug which is really necessary, but there is no room within a national system of this kind for prescribing which is unnecessary, either in quality or in frequency. The duty of deciding whether any individual practitioner, whose costs seem to be unnecessarily high, has been guilty of wasteful prescribing is still left to the Panel Committee, but the regional officers of the Ministry (whole-time men) have now been given duties in connexion with the investigation of *prima facie* cases which formerly were carried out by the Panel Committee alone. There is a possibility that unless the rising cost of the provision of drugs is checked, an attempt may be made to revive the system at first in force, whereby it was made to the pecuniary interest of the doctor to see that the charge per head did not rise above an agreed standard amount. This standard amount was in pre-war days 1s. 6d. per head over all the insured; the sum of 2s. was set apart for drugs; and the doctors in the area shared between them any amount between 1s. 6d. and 2s. a head. It was an ingenious method and was on the whole effective, but it left room for the suggestion that it paid the doctors to keep down the quantity and quality of the drugs below what was proper and we were glad to get rid of it. I do not know what method of provision of drugs may be suggested in Australia, but I have no hesitation in saying that you will find this one of the thorny problems. This question can only arise in the towns where the chemists naturally claim to carry out the dispensing. In the country where there is no chemist within reasonable distance, the doctor has to do the dispensing himself and is allowed 2s. a head of all his list to cover the drug costs for the year.

Political Influence.

On reading over my American articles I would like to emphasize one or two points made in them.

In the first place I would again urge the desirability of keeping this business free from party politics, if possible. I know this is a counsel of perfection, because though we tried hard to do it, I am sure that the opinion of many of the men who went through our original fight, was strongly coloured by their liking for or dislike of Mr. Lloyd George and his politics. The attitude of our colleagues in Australia seems to me to have been absolutely correct on this matter up to now, but the fight has not yet come and I warn you that it will be very difficult to keep the disintegrating effect of party politics out of the minds of the medical profession when it does come.

The necessity for obtaining and retaining public opinion on the side of the profession in this discussion cannot be too strongly emphasized. The tendency is for all matters of this kind to degenerate apparently into a struggle for more money. The cash nexus cannot be ignored by members of the profession any more than it can be by manual workers, but it should not be over-emphasized and the profession and the Association in Australia should spare no pains through the medical and lay press to convince the public that in fighting for the interests of the profession, it is fighting also for the interests of its patients—the public. You will find it difficult to restrain some of your own men from writing letters or giving interviews which may do the cause much harm, because of want of experience in dealing with medical politics. I would strongly urge that every attempt be made to get your members to leave public discussion in the hands of their leaders who are trained experts in these matters. When confronted by reporters and interviewers with statements made by ingenuous and blundering doctors in various parts of the country, how often have I wished to be saved from my friends!

On the whole I think the profession in this country believes that the introduction of national health insurance has been to its advantage and to that of the public. The profession is undoubtedly receiving remuneration for many persons who in pre-insurance days did not pay at all or paid very inadequately. We have been delivered from the yoke of the friendly societies, which pressed very hard indeed upon many doctors in the poorer industrial areas, the old competition for poorly paid contract practice has been abolished and the higher remuneration paid by the Government for attendance on insured persons has increased the standard of medical remuneration all round. But these things cannot be got without paying the price and it will be for the next generation to say whether we have paid too highly or not. Some of the old individuality and freedom of the profession has disappeared under regulations which, devised for offenders, are having a gradual effect upon all the doctors working the Act. It does not matter how good the level of the profession may be, there will always be some who do bad work and whose offences bring reprobation on the profession as a whole. It is such as these who compel Government departments to produce regulations to keep them in order, and, of course, regulations have to be of general application. And one also has to reckon with the curious psychology of bureaucracy. The appetite grows with what it feeds on and there is a tendency to elaborate regulations apparently for the mere fun of the thing which must be met by continual vigilance and resistance on the part of the profession.

As soon as the profession becomes part of a Government system, it is far more subject to public criticism in the press and this has the effect of taking away some of the glamour and mystery which have always surrounded the medical profession. I suppose in these modern and irreverent days this was bound to happen, but I am sure that the taking of public money under Government regulations and consequently publicity have hastened the process.

Publicity and Discipline.

If you establish a national health insurance system in Australia, you can depend on occupying more space in the public press than you now dream of. In so far as the necessary regulations make things awkward for inefficient practitioners, they are all for the public good and in the long run for the good of the profession. At the present moment the insured person in England has far more protection against inefficiency and carelessness on the part of the doctor than the private patient has. The only remedies of the latter, if he is not satisfied, are to change his doctor or to refuse to pay his bill and take his chance of exposing him when the doctor sues him for it or in extreme cases have the doctor prosecuted for malpraxis. But the insured person can in addition bring a complaint against the doctor before an insurance tribunal, the result of which may be: (i.) To have the doctor censured, (ii.) to have him fined or (iii.) to have him removed from the panel and so rendered incapable of attending insured persons. I do not wish to cast any reflections upon the general fairness or efficiency of these tribunals, because the local ones are composed in equal proportions of representiatves of insured persons and representatives of doctors with a neutral chairman and when in the more serious cases the Ministry of Health holds an inquiry, the court is composed of two doctors and a lawyer. Some such system is an inevitable accompaniment of any national insurance scheme.

The Development of the Scheme.

Another point emerges from our experience of inquiries into complaints. Theoretically it is just as easy for the doctor as for the patient to bring a complaint. But practically it is hardly ever worth the while of the doctor to bring a complaint against the insured person and when he is goaded into doing so and succeeds in bringing the offence home, it is found to be far more difficult to penalize the insured person effectively than it is to penalize the doctor. One of the things that we have already complained about and will have to prosecute further, is the necessity of finding some effectual punishment for persons who bring frivolous and unsupported charges against insurance doctors.

The effect of the insurance service on other medical services is very striking. In the last two or three years members of the profession doing whole-time public health work have been comparing their remuneration with that of other branches of the profession and the matter was brought to a head when in demanding a decrease of the insurance capitation fee the Ministry of Health pointed out that the whole-time services of competent public medical officers could be obtained at a salary which was much less than that paid for national health insurance work. I do not think they will be able to make that statement again, for since it was made, a very active campaign has been put into operation which is already having a distinct effect uopn the average remuneration of medical officers of health. And it will not end there. Teachers and demonstrators in medical schools, underpaid members of certain Government medical services and others have already benefited by the example. I have not space to go into further detail, but no one in my position can fail to be struck with the tremendous direct and indirect influences which national health insurance has had on all sections of the profession, most of them, I think, for its good.

The effect on the public has been not less marked. There is now a strong demand for a complete service. As explained in previous articles, the present service supplies only what the general practitioner can provide and the insured person has to pay privitely for specialist or institutional services or to get them through medical charities. The provision of a full general practitioner service for a third of the people of this country has stimulated a demand for an equally good provision for the remainder, especially, of course, the dependants of insured persons and for the filling up of the gaps in the present incomplete service. Under the original *Act* it was provided that at the end of each five years there should be a valuation of the funds of each approved society and those that had surpluses were to be allowed to expend them on the provision of what are called additional benefits. One valuation (in respect of the period 1913-1918) was completed in 1922, another one (in respect of the period 1919-1923) will shortly be declared and it may be said that the result has, on the whole, been very satisfactory, most of the approved societies being able to declare large surpluses. Some of the surpluses have been devoted to giving additional cash benefits for sickness, but many of the more far-seeing societies have devoted a considerable proportion of their surpluses to providing dental treatment, payment towards the cost of maintenance in hospitals, provision for diagnosis and treatment of errors of refraction, residence in convalescent homes and so forth. This you will see has brought in some of the consultants already, especially ophthalmologists who are intensely interested in the way in which the ophthalmic work is being done. Most of the societies are, unfortunately, allowing their members to go to opticians for the sake of getting the work done cheaply. One or two, however, are paying a modified fee to ophthalmic specialists and important questions have cropped up as to how these consultants and others who will undoubtedly follow as more surpluses are available or as the State extends the general service, are to be paid.

If any of your members in consulting practice think that the problems of national health insurance do not affect them, I would beg them to drop that idea at once. Many of their colleagues in this country are still under the blissful delusion that the profession can be kept in watertight compartments and that these mere vulgar questions of finance, so important to the general practitioner, do not concern the consultant and specialist or the general practitioner who does no contract work. National health insurance is forcing home the truth that the profession is one and indivisible and that what affects one section, must sooner or later and directly or indirectly affect all. The ophthalmologists are now in earnest consultation with us to prevent awkward precedents being set up for them and other consultants. The Royal Commisison which will shortly begin to sit to consider the whole question of national insurance, will, in my opinion, probably advise the Government to give a complete service either for the present insured persons or for them *plus* their dependants and when this comes about, there will be few consultants who will not find themselves very directly interested in national health insurance. I most sincerely hope that this aspect of the question will not be overlooked.

The national health insurance system of this country has undoubtedly come to stay. It was a great experiment and it has been and will continue to be subject to much change in accordance with the usual English fashion of proceeding by trial and error. But I fancy that Mr. Lloyd George's reputation as a politician will probably go down to history more firmly connected with this piece of social legislation than with anything else he has done, apart, of course, from the prominent position he occupied during the war. The system was supposed to be based on the German model, but it is a very different and to my mind a much superior system and in this I am confirmed by the letters I frequently receive from German doctors complaining bitterly of the inadequate remuneration and inferior status of the insurance doctor in that country. The crucial difference between our system and the German system was made when we fought for and secured the elimination of the approved societies from the administration of medical benefit and more than anything else I would urge on our colleagues in Australia to refuse emphatically and absolutely to have medical benefit administered by anything analogous to our approved societies; the analogy in your country, I suppose, will be the friendly societies. They may quite fairly be used in administering the cash benefits. We could not have established health insurance as a system without their help. But the Government must be primarily responsible for any compulsory system and so far as the status of the medical service and the remuneration paid for it are concerned the dealings should be between the Government and a body representative of the medical profession. The profession should insist upon being allowed to manage purely professional affairs as

much as possible. I would not dream of asking that the whole system should be administered entirely by doctors. That in my opinion would be an unconstitutional and retrograde step. I have a horror of government by experts shared, I believe, by the average Britisher. But I have a great admiration for the modern idea of giving the worker a share in the government of his calling and the medical profession in this country has set one of the most outstanding examples of the application of this principle that is to be found anywhere. The Panel Committee locally represents the doctors doing the work and deals as an organized body with the Insurance Committee. The British Medical Association centrally acts as the agent of all the Panel Committees and deals with the Government department and without hesitation I suggest this as a model to Australia.

I am not competent to express an opinion as to whether any scheme of compulsory health insurance is necessary in Australia or not. It was necessary in this country because we have a large industrial population, mainly collected in the towns and experience showed that a great proportion of these had no margin by which they could get and pay for medical attendance when they required it. The Government was, in my opinion, justified in helping these persons to help themselves and the only practical way was by a compulsory system. Whether in your much more sparsely populated country, with far less industrialism, it is necessary to have a compulsory system applicable to all your wage earners is a matter of controversy on which I express no opinion. But as an outsider who has watched for many years your controversy with the friendly societies, it seems to me you have a problem somewhat analogous to ours in pre-insurance days, though of course much smaller in size. There is obviously a section of the public who must be dealt with on contract lines, and it is for your Parliament to decide whether the section is large enough to need Government interference. You have settled your old dispute with most of the friendly societies on a basis which you consider equitable. The settlement may or may not be permanent, but I would just point out that the terms you obtain from your friendly societies are not as good as those we get from the insured persons in this country. According to answers given to your Royal Commission persons admitted to your lodges are eligible for medical benefits who have not more than £260 a year, which is £10 higher than our income limit for health insurance. Payment of the doctor is stated to be 26s. to 32s. a head, but if this is divided amongst the 4.2 persons stated to be represented by each lodge member, your payment per potential patient at the higher rate is less than 8s., whereas ours is 9s.. I am not clear whether the Australian doctor provides medicine or not. His British colleague does not. Then again I see that Dr. Croll stated that the average number of visits paid per member *per annum* in lodge work was from ten to fifteen over the whole membership list. This is nearly three times as much as our average which, taken over many thousands of names and over a period of several years, works out at 3.8 attendances (visits at the house and attendances at the surgery) per person on the list, not per patient attended.

Finally let me say that if your country decides to have a system of national health insurance, the British Medical Association would do well to insist on getting such remuneration as will enable the doctors undertaking the work to make a fair income for that work without the temptation to undertake more of it than the conscientious doctor knows can be done under modern conditions with justice to himself and to his patients.

THE RADIATION METHOD OF CANCER TREATMENT.[1]

By H. M. MORAN, M.B., Ch.M. (Sydney), F.R.C.S. (Edin.), *Sydney.*

IF we admit that the surgical treatment of cancer in respect of certain forms of the disease is not of great value, we have yet to face the question: In the present state of our knowledge what can we expect from radiation? It is a fair question and the answer demands a preliminary explanation.

The observer is always struck with the extraordinary variation in the immediate results obtained from radiation methods and we find on investigation that there are physical, structural and clinical factors which modify the behaviour of a radiated tumour. On the physical side we have the extremely difficult matter of dosage and of filtration. If the dose be not sufficient and uniformly distributed, it is possible while delivering a lethal dose at one part to stimulate an outlying portion of the tumour. Then as regards structural conditions, Ewing[1] has shown that certain tissues are resistant to large doses of radiation, while others are extremely susceptible. Neuro-fibro-sarcoma is as resistant as normal healthy tissue and hornifying squamous carcinoma is equally slow to respond. Briefly we may say that the more embryonal and the more undifferentiated the type of cell, the greater the sensibility. Then again cells in the process of dividing are peculiarly susceptible. Radio-sensibility is a characteristic of the nucleus and also of certain temporary states, such as reproduction. Cells containing large amounts of chromatin substance are more easily killed than those with less. The endothelium of blood and lymph vessels is very sensitive, so that tumours having an abundance of thin-walled, delicate capillaries react more quickly and more thoroughly than those with a scanty blood supply. Tumours with a small amount of intercellular tissue are also quicker to respond. Lastly, a period of heightened sensibility corresponds to that of the maximum metabolic activity of the nucleus in cells which have a secretory function. Regaud[2] asserts that the γ and X-rays are elective poisons for the nuclear chromatin upon which heredity depends, whence the

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on June 26, 1924.

power to suspend or suppress cellular reproduction in a tissue.

The clinical conditions modifying a result may be local or constitutional. The local conditions found most favourable are a round celled infiltration in the zone of proliferation of an uninfected tumour and a connective stroma of normal appearance with a minimum amount of inflammatory reaction, the presence of capillaries well formed and of a peri-vascular infiltration of round cells and poly-nuclear eosinophile cells.[3]

As for constitutional factors, when cachexia is well marked the ultimate prognosis, even in the presence of local conditions that are favourable, is never very good. Any constitutional disability must lessen the capacity for repair.

The new growths in which radiation can offer something, can be separated into three classes: (i.) Those tumours which from the beginning are inaccessible to surgery; (ii.) those tumours for which excision is the accepted treatment, but for which the results can be improved by the addition of radiation; (iii.) those tumours which, though operable in the early stages, have reached the stage of inoperability.

Primarily Inaccessible Tumours.

Under the heading of primarily inaccessible tumours are included the mediastinal tumours, the lympho-sarcomata, cancer of the œsophagus and cancer of the thyreoid. Deep X-ray therapy can at times effect the complete disappearance of mediastinal tumours and this result, though temporary, represents a considerable advance. The lympho-sarcomata are very susceptible to radiation. In thyreoid cancer the progress of the disease can be delayed and an occasional cure has been reported. In cancer of the œsophagus there is rather a promise of something to come. One must insist, however, on the necessity of performing gastrostomy as soon as the diagnosis is made, for these patients are often so reduced by starvation that it is difficult after retrogression of the growth to restore their former strength. In one patient whose condition was unfortunately very advanced, I did a gastrostomy and during convalescence Dr. Godsall examined him with an œsophagoscope and introduced a tube of fifty milligrammes of radium which was left in for twenty-four hours. He was subsequently submitted to X-ray examination by Dr. Molesworth. The local condition improved so much that he was able to swallow solid food again, but he died some months later of secondary deposits in his spine. Metastases in such cases come late. The disease remains local for a time and usually kills by local spread, so that with an improvement in technique and experience we may be able to do something for a disease which is otherwise hopeless.

Tumours Suitable for Combined Surgical and Radiation Treatment.

In Class II. we have those forms of growth, in which surgical measures alone do not reap the full harvest. First among these comes cancer of the breast. The modern radical operation in the best hands gives barely 50% of cures up to three years. Now we know that in breast cancer recurrence takes place in a considerable number of instances more than three years after operation. The result of the operation being made more radical has been to diminish the number of local recurrences, but local recurrences do still occur mostly in the supra-clavicular and anterior sternal regions. It is therefore the routine practice in Mr. Sampson Handley's clinic to leave a tube of radium for twenty-four hours in the supraclavicular region and to have the whole area irradiated as soon as possible after the operation. When local recurrence has occurred, radium needles are inserted into the mass. The result in some of these cases has been something at which to marvel; even in the apparently hopeless cases the local improvement obtained is considerable.

It is possible to shell out a small proportion of malignant prostates and in these patients a tube of radium should be left in the remaining cavity. If the growth is towards the posterior lobe which seems most often the seat of predilection, a tube with a window should be used, the window being directed posteriorly. Such treatment, combined with deep therapy, will delay local recurrence.

Endothelioma of the parotid is coming more and more within the scope of the radium therapist. This is emphasized in the report of the Manchester Radium Institute for 1921 and it is laid down that no surgeon should attempt operation in such a case without having by him a tube of radium for use at least as an auxiliary. We read that after radium treatment they had one patient well after more than six years, two after more than four years, one more than three years and four more than two years. This represented over 30% of the cases in which treatment had been given. Many of them had been recurrences after surgical operation. In this position the cosmetic advantages of radiation over surgery are obvious.

The value of radiation as an auxiliary in carcinoma of the jaw, tongue, lips and cheek was conceded by George Crile in a paper read before the Clinical Congress of American Surgeons in October, 1922. He pointed out that among 4,500 reported autopsies only 1% showed secondary foci in distant organs or tissues. Thus when death results from a cancer of the neck and head, it is because of a local and regional development of the disease and not from a distant invasion. The collar of lymphatics about the neck forms an impassable barrier through which cancer rarely passes. It is Crile's practice to give a single post-operative dose of radium or X-rays.

At the same Clinical Congress E. S. Judd and G. B. New stated that during the previous few years at the Mayo Clinic all their patients in whom surgical treatment had been given, had post-operative radium application over or into the tongue and outside the neck. It is generally conceded that such post-operative treatment has increased the precentage of cures and in many cases has considerably prolonged the period before recurrence.

Inoperable Tumours.

The inoperability of a tumour varies within certain limits with the particular surgeon. For example, Bonney states that the percentage of operable cases of cancer of the cervix in patients presenting themselves at the Chelsea Hospital for Women is as high at sixty-four. On the other hand, Cole, while surgeon registrar at the Cancer Hospital, found only 7% of such patients during three years were operable.[4] In other words, the condition in 36% of Bonney's patients and in 93% of Cole's was inoperable when first seen. Our experience in Sydney would indicate that these are the two extremes.

We have in inoperable caroincma of the *cervix uteri* a vast field, for the relief that can be given to these sufferers, though temporary, is indisputable. It is my practice in these cases to introduce a tube of radium containing fifty milligrammes as far as possible into the uterine cavity and leave it there for twenty-four hours. Then it is withdrawn partly, so that it lies in the lower part of the uterine canal and in the cervix. At the same time needles to the amount of fifty milligrammes are inserted into the cervix in such a manner as to surround the ulcerated area. These remain in for another twenty-four hours, when tube and needles are removed. Subsequently the vagina is packed daily with gauze, soaked in a non-irritating antiseptic lotion. The improvement becomes noticeable after three or four weeks. There is a diminution of the offensive discharge and a cessation of bleeding. As soon as possible after the radium treatment, the deep X-ray therapist should be asked to radiate the pelvic gland areas. During the last twelve months I have seen nine cases of cervix cancer all of which were hopelessly inoperable. All patients received radium treatment, but several could not afford the cost of deep therapy. Relief was given in all instances. One had a violent hæmorrhage subsequent to a second radium application. Unfortunately she had been having, before I saw her, applications of a radium plaque of a few milligrammes placed within the vagina for a few hours. Nothing could be more culpable. It is useless to attempt treatment in these cases with less than one hundred milligrammes. In passing, let me say that the whole subject of treating cancer of the cervix when inoperable is worthy of far more attention than it is given. The cold cautery which consists of a poker at a temperature below that of the actual cautery, has a distinct place in the treatment, as also has diathermy. The ligation of the internal iliac arteries, the ovarian arteries and the round ligament is worthy of use, especially in those patients in whom the abdomen has been opened and the radical operation which had been intended, is found impracticable.

It is a point which cannot be over-emphasized, that inoperability in cervix carcinoma is an anatomical inoperability. At quite an early stage in its career this cancer spreads its tentacles about the bladder or the ureter or the rectum in such a way as to make effective excision impossible. Distant metastases are late; local recurrence is early and usual. When recurrence takes place after operation, as it does in 70% of the cases selected by the surgeon, it is nearly always local, *id est* in the vaginal vault. Leitch[5] in nine hundred and fifteen necropsies for uterine cancer found that 55% of those who had died unoperated on, had died as a result of the local lesion. These figures are in keeping with those obtained from one hundred similar necropsies at the Cancer Hospital. Here then is a disease which remains local for a considerable time in a large proportion of the cases, but whose position is such that it soon passes at an early stage out of the sphere of practical surgery. Radiation methods offer the most promising instrument for its eradication or palliation.

In carcinoma of the larynx which has passed the stage of successful excision, there is a definite, though smaller field. The improvement which temporarily follows deep therapy, is at times astonishing. In a case of intrinsic cancer of the larynx which had involved the glands extensively, Dr. Halloran on my suggestion performed thyrotomy after preliminary low tracheotomy, and I inserted forty milligrammes in needles directly into the growth. The glands were subsequently radiated by deep therapy and a good temporary result was obtained.

In malignant prostate Hugh H. Young[6] uses long prostatic needles containing at the tip 12.5 milligrammes of radium. They are introduced from the perineum and left with the tip in a cancerous lobe or even pushed beyond into a malignant mass above the prostate. They are allowed to remain in from eight to twenty-four hours. Treatment is also given by applicators introduced into the rectum, bladder and urethra, each applicator containing one hundred milligrammes, being screened with two millimetres of platinum and a thin layer of gutta percha and left in contact with a particular area for one hour. I have had one remarkable improvement with needles inserted into the prostate after opening the bladder, a tube of fifty milligrammes being at the same time in the prostatic urethra. This man has been free from symptoms for a year. In three other cases definite improvement had followed with local retrogression of the tumour. Young claims some excellent results and considerable palliation in many instances. "A great boon," he writes, "can often be furnished and the remaining months or years of the patient's life made more comfortable."

Denning[7] of the Brady Urological Institute, Johns Hopkins Hospital, writes: "Symptomatically, the results from radium have been most remarkable. Seventy-seven *per centum* of the cases show a relief of some or all of the symptoms."

Conclusion.

I have purposely avoided the more contentious aspects of the subject in order to make a reply, convincing to surgeons who are not partisan, that radiation has a valuable place in the armamentarium against cancer. For this reason I have not discussed pre-operative radiation which, although theoretically justifiable, has certain surgical dis-

advantages, such as the tendency to an increase in bleeding, if operation is performed in the reaction stage, and at a later stage a difficulty from added adhesions. Nor have I referred to the striking results obtained by Reguad and Quick in the treatment of cancer of the head and neck by radium alone.

The particular provinces of radium and X-rays supply another matter for argument, but it is rather an affair for the technicians. In general, we may say that X-rays cast a wider net, but that the mesh of radium is smaller. In certain positions radium needles or emanation tubes can be inserted, where accurate focussing of the deep rays is difficult or impossible. The *cervix uteri* and the tonsil are cases in point. But the truth is that these two agents are more or less complementary and necessary to one another. The sphere of influence of the inserted radium is limited, but even so it is of much wide rextent than that of the scalpel which exercises no power beyond the line of its incision. And where anatomical considerations place the growth out of bounds of the surgeon, the path is still open for the radium therapist.

It is important to insist that the therapist in this work is not a miracle worker who can recall from their inevitable grave the cachetic failures of surgery who come clutching at the new method of treatment. The existenc eof widespread metastases in an abdominal condition is obviously a contra-indication. In diseases affecting bone tissue radium is useless. In cystic conditions, especially if the cyst is tense, it has no effect. Lipomata are not influenced by it. We all see patients in whom surgical intervention has acted as a spur to the disease, in whom at times the operation would be best described as culpable interference. Even so, radiation may become a two-edged blade. Nothing is more calculated to quicken the downward gait of the cancer sufferer than the wanton use of radiation inadequately or indiscriminately. But the great art of surgery has survived the incompetence of some of its practitioners and we must not expect that in the half-gloom of a new science where all fumble uncertainly that we shall be able to exclude the foolhardy and the unscrupulous.

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THE RADIATION METHOD OF CANCER TREATMENT.[1]

By E. H. MOLESWORTH, M.B., Ch.M. (Sydney),
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IN writing a clinical account of deep X-ray therapy one is handicapped by the short period of time, about three years, since the inception of this work in Australia. Therefore one cannot be dogmatic on the question of cure with such a short period on which to work.

But we can say that the benefit conferred upon many—we might even say the majority of patients—has been remarkable, especially when we consider the derelict state of most of the patients that come up for this form of treatment. I think that all sarcomata, uterine and mammary cancers benefit enormously. The irradiated areas often clear entirely of all signs of growth even without operation and it is the metastases especially in breast cases that bring about the end. Of course we can and ought to follow these up when possible. But it is often impossible on account of multiplicity or situation or general condition of the patient who too often loses heart when a distant metastasis appears.

Considering the number of uterine carcinomata and the good results reported, it is astonishing how few patients come up for deep X-ray treatment or radium treatment, but that is apparently due to a misconception.

In considering results from irradiation by deep X-ray therapy or radium needling it is too often considered that one failure to cure outright justifies a conclusion that the method is of no use. But is that test applied to surgery? Again, is the benefit that ensues, even if only temporary, worth the expense, fatigue and tedium involved? The risk is minimal anyway. But there seems to be a misconception of this sort. Irradiation is regarded as a rival method to be damned with faint praise. There should be no rivalry in methods adopted for combating cancer. No method is so satisfactory as to justify the exclusion of others when practicable and the radiation men fully realize this, though some men practising surgery do not. The results obtained by combined methods are so much better than those obtained from either method alone, that it seems unjustifiable for a surgeon to be ignorant of them or to ignore them. Yet only a very small proportion of patients operated upon for cancer are given the opportunity of having pre- or post-operative irradiation.

In any case, the function of the man practising medicine is not only to cure, but to delay the progress of disease and relieve the pain and discomfort occasioned by disease. And this last is most certainly done in cancer more efficiently by radiation methods than by any other.

Is there anyone present who is so satisfied with his or her results in treating cancer that he can

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on June 26, 1924.

afford to neglect the use of it in any case when it is applicable with or without operation, or even fail to use it for palliative purposes when a permanent cure is too much to hope for? I think not.

In the near future we hope to establish a cancer research campaign and the publicity of such a campaign will undoubtedly instil into the public mind the truth that the man who adopts only surgical or only irradiation methods of treatment of cancer, is a prejudiced or ill-educated individual and cannot be trusted with the management of such a condition.

In selecting a few cards for case quotations tonight I have avoided all conditions upon which I could not obtain a recent report and also have not used numerous instances in which freedom from recurrence after combined treatment has not been long enough to justify conclusions. I have confined myself to patients who have derived obvious benefit from irradiation alone when surgical measures were impossible, in order to show how large a share irradiation can bear alone, if called upon to keep in the fight against cancer.

In some instances pathological examination was not obtained, but in the majority examinations have been carried out in this way. The clinical evidence in the others is so strong as to be almost incontrovertible and the results coincide so well with reports of similar cases in which pathological examination was done, that I think their inclusion is admissible.

The following are a few cases:

Clinical Histories.

Sarcomata.

I.—Mr. J.B., *ætatis* twenty-five years, was sent by Sir Alexander MacCormick on February 3, 1923, for irradiation of a huge mediastinal growth occupying the whole of the left side of the thorax and pushing the heart away over to the right side. A skiagram taken by Dr. Edwards shows a shadow down to the eight rib in the nipple line and slightly to the right of the sternum. He was operated on by Sir Alexander MacCormick in the axillary line. He found the mass to be solid and inoperable. He could only walk very slowly on account of dyspnœa. He was irradiated on the fourth to the tenth of February with four ports of entry. On March 2, 1923, a mild erythema was present. Dulness was less noticeable on the anterior aspect of the chest, but still present over the posterior part of the left side of the chest. On March 15, 1923, resonance was present except at the left anterior apex and the upper axillary region. Dulness was still present, but was less flat over the back. On March 16, 1923, radiographs still showed a definite shadow and radiation was repeated between April 17 and 23. On May 26, 1923, the patient felt well, could ride for half a day or play tennis or golf. On August 23, 1923, radiographs still showed a shadow, but it was quite different in appearance and the radiographer suggested that this shadow was due to thickened pleura. The patient had steadily put on weight and could take almost any exertion and felt well.

This patient has since gone to America and has taken his plates with him. He has been examined in San Francisco, Chicago and New York. Dr. Pope who has been travelling with him, reports that the examining medical practitioners find no trace of sarcoma and assure him he never had one. But as Sir Alexander MacCormick's finger on the growth is more dependable than an examination over the previous situation of the growth, we may, I think, take that remark to be flattering. The patient continues in excellent health, has no dyspnœa. Dr. Mills has been looking after this patient and can tell about him. Over a year has now passed since his last irradiation and the outlook appears hopeful.

II.—Mr. N. was seen on March 29, 1923. The left arm had been amputated for sarcoma by Sir Herbert Maitland. According to the pathological report the tumour was a round-celled sarcoma. A large mass as big as a cricket ball was present just below the clavicle and a gland could be felt on the left side of the neck. Radiation was undertaken with a two hundred kilovolt current and a filter of half a millimetre of copper with two ports of entry cross-firing through the growth. The gland was included in the upper part. On May 7, 1923, the mass had quite disappeared and the gland also. The patient said it began to diminish five days after irradiation. On June 13, 1923, the original area was quite well. A mass was present in the right axilla and another at the right angle of the jaw. The patient had put on 10.9 kilograms (one stone ten pounds). Deep X-ray applications were made by single ports of entry to the two metastases. On August 15, 1923, both metastases had quite disappeared. On April 7, 1924, previously irradiated masses were quite well, but there were present a gland in the right side of the neck low down, another below the mastoid and a small nodule in the left scapular region. The patient, however, felt well and was able to work. These areas were irradiated. Yesterday I had a note to say that all seemed clear and the patient said quite casually that he did not intend to come down again until something else appeared.

Whatever is the ultimate result of these metastases, the apparently permanent result on the irradiated areas is a very valuable bit of evidence and the patient has been given over a year of (to him) perfect health.

Mr. F. (demonstrated tonight) has a spindle-celled sarcoma of the buttock. This is the pathologist's report. It was irradiated on May 27, May 29 and June 2 from three cross-firing ports of entry. The mass has already diminished in size and is more movable. I have demonstrated the reaction.

Carcinomata.

Mrs. O'D., *ætatis* forty-five years, was sent by Dr. Constance D'Arcy for deep X-ray therapy on December 29, 1922, for inoperable carcinomata of the *cervix uteri*. There was a fungating friable mass involving the posterior wall of the vagina. Dr. D'Arcy regrets that the curetted material was lost and no pathological examination was made, but states that the clinical history and appearance were unmistakable.

On December 29 and 30, 1922, the pelvis was irradiated with cross-firing doses of deep X-rays.

On February 12, 1923, Dr. D'Arcy reported that the condition had healed except for one tiny red spot. The uterus was movable. A little rectal irritation from the radiation persisted. No hæmorrhage had occurred later than ten days after irradiation.

No further irradiation has been made, but the patient has been regularly examined by Dr. D'Arcy whose last report received by telephone two days ago was that the patient remained perfectly well. The site of the tumour has completely cicatrized, though no cervix remains. This is now eighteen months since treatment.

II.—Mrs. T., seen on January 16, 1923, had been operated on by Dr. Armstrong thirteen months previously. She had been seen by Sir Herbert Maitland and Sir Alexander MacCormick and both refused operation, but advised deep therapy. Vaginal examination revealed a large mass involving both lateral and the posterior walls of the vagina and slightly the anterior upper wall of the vagina. Rectal examination revealed a mass projecting backwards almost to the sacrum and fixed to the pelvic walls. Deep X-ray therapy was applied to the pelvis in cross-firing doses with

four ports of entry on January 16, 17 and 19, 1923. On February 19, 1923, patches of irradiated skin were brown. The patient complained of rectal irritation which so often accompanies a full dose in the centre of the pelvis. Bleeding *per vaginam* had ceased for nearly a fortnight and the patient felt much better. On March 1, 1923, it was noted that the patient had continued to improve, she was putting on weight, there was no bleeding and the general health seemed good.

Irradiations were repeated on March 1 and 2, 1923. On June 20, 1923, it was seen that there was a fibrous thickening behind the upper portion of the vagina apparently binding down the rectum. The patient had continued to put on weight. Her weight was sixty-three kilograms (ten stone), a gain of three kilograms. She felt very well and was able to work in comfort. She was instructed to report to Dr. Potts every month. No further irradiations were made.

On September 24, 1923, the patient was very well. She suffered no inconvenience, had no discharge, her weight was 63.45 kilograms and she felt perfectly well.

On June 24, 1924, Dr. Potts reported the patient as perfectly well. She was earning her living as a waitress at the Central Railway Station. She still has a fibrous band across the rectum, but no sign of recrudescence of growth eighteen months after treatment.

Mrs. G., *ætatis* eighty-six years, was sent by Dr. Maclean. She had an ulcerated scirrhus of the left breast and a large gland in the left axilla. From March 30, 1923, to April 5, 1923, she was irradiated with great difficulty, owing to her inability to lie on her side or any way except propped up almost in a sitting attitude. The lesion apparently healed in a few weeks, but in November, 1923, it again became active and the patient was again irradiated with good result. Of course a second irradiation ought to have been done from six to eight weeks later, but it was considered inadvisable on account of the patient's great age.

Mr. K., *ætatis* thirty-three years, had a large mass in the neck, declared after pathological examination to be epithelioma. Brawny induration was present right down the sterno-mastoid. He was sent by Sir Alexander MacCormick for deep radiation. He regarded the condition as inoperable. On September 29, 1922, two cross-firing doses were given to the mass. Nothing further was heard of this patient and I supposed he was dead or dying, but on July 19, 1923, he turned up with a small mass above the original one just below the ear. All the originally irradiated area was perfectly well. Another irradiation was done and the patient promised to report every month to his local doctor who saw him twice. On both occasions he was apparently well. Since then he has not bothered to leave his farm to report, but I understand he is still well.

Mr. B., aged about forty years, was sent by Dr. Gordon Craig on December 14, 1923. He had noticed hæmorrhage from the bladder two and a quarter years previously. He was operated upon fifteen months before by Dr. Gordon Craig. The pathologist had reported the growth as adenocarcinoma. Bleeding recurred twelve months later. On December 20, 21, 22 and 24, 1923, four cross-firing deep X-ray irradiations were given to the bladder region. On January 8, 1924, he felt better and had no bleeding and much less bladder irritation. On February 1, 1924, the patient felt well. He had had only one very slight hæmorrhage three weeks before. After a cystoscopic examination three days before, Dr. Craig reported complete healing, though the area remained slightly raised. On February 11, 12, 14 and 15, 1924, four cross-firing deep therapy doses were given as before. On February 26, 1924, the patient felt perfectly well. No hæmorrhage was present. On May 1, 3, 5 and 7, 1924, irradiation was repeated. On May 23, 1924, Dr. Craig reported that on cystoscopic examination done fourteen days after the last series everything was entirely healed and the cicatrix had contracted down, leaving little room for surgical removal of cicatrix which we had meditated. Dr. Craig said he regarded the patient as clinically cured. The patient is to report for another cystoscopic examination in September, but has now returned to Rockhampton in apparently perfect health.

Myeloid Leuchæmia.

Miss T., aged about thirty years, was sent by Dr. Phipps who had got Dr. Blackburn to see her. Blood count showed advanced myeloid leuchæmia. The spleen occupied the whole of the left side of the abdomen right down into the pelvis. The patient was very ill and only able to walk from waiting room to X-ray room with assistance. On October 30, 1923, and November 1, 1923, two cross-firing deep therapy doses were given to the front and back aspects of the spleen. On December 19, 1923, Dr. Phipps reported her as walking about and being much better. On January 16, 1924, Dr. Phipps reported that she could walk and looked nearly well. Dr. Phipps reported also that the spleen was only a finger's breadth below the ribs. On January 23, 1924, the patient came in walking after travelling by train, boat and tram, though she had to be carried in on the previous occasion. Cross-firing deep therapy doses were repeated. On June 26, 1924, Dr. Phipps reported that the patient was apparently quite well. She declines to have a blood count done as she considers it an unnecessary expense.

Conclusion.

These cases show, I think, that great benefit can be conferred and that even cure is possible, but that a combination of effort and method is desirable. Can we not, therefore, combine better and I am sure we shall if we take the pains to examine our results and observe the results of others.

THE RADIATION METHOD OF CANCER TREATMENT.[1]

By B. J. M. HARRISON, M.B. (Sydney),
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IN spite of its absolute empiricism, surgical removal has remained the method of election in the treatment of malignant masses throughout the history of medicine. Time showed that it was the treatment *par excellence*, but the last decade has brought to light modes of attacking the disease which are more logical as well as being more in accord with Nature's methods. If we are to progress, we must examine closely the basis of these radiation methods and review the data on which its adherents base their claims.

The results which have been obtained and are being obtained, cannot fail to make us realize that the application of radiation before the patient is incurable has been but insufficiently tested and that further experience must improve on the present results.

Carcinoma of the Lip.

There are two main types of carcinoma of the lip —the basal celled and squamous celled.

Basal-celled carcinoma responds well to surgical treatment, but the cure is always attended by a deformity of greater or less degree. On the other hand, it responds very well to irradiation and when cured, shows an almost invisible and very pliant scar.

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on June 26, 1924.

M.C., a female, aged forty-seven years, was seen on May 6, 1923. Three years previously a small ulcer had been removed from the upper lip by Sir Alexander MacCormick after being present for two years. It recurred two years after operation. It was eighteen millimetres long on the line of a scar on the upper lip extending to the mucocutaneous junction and exhibiting also some ulceration on the mucosal aspect. Surgical treatment had been advised, but the thought of the resulting deformity was sufficient to deter her from further surgical interference. She was irradiated on May 8, 1923, and by June 21, 1923, the reaction had practically disappeared. She was seen again on January 17, 1924, and the condition of the lip was perfect.

Squamous-celled carcinoma of the lip may be papillary or infiltrating. These respond to surgical treatment—the papillary type well, the infiltrating type not so well. It is interesting to note that the usual V-shape incision used for local removal of these conditions is of the proper shape for dealing with the less malign, papillary type, but is most unsuitable for dealing with the more dangerous infiltrating type, the extent of which is greater away from the free margin of the lip than it is at the free margin.

W.H., a male, aged forty-nine years, was seen on January 5, 1924. He had a papillary carcinoma of the lower lip about 2.5 by 3.75 centimetres (one by one and a half inches) on the surface and about one millimetre deep. He also had an epidermoid carcinoma of the infiltrating type just in front of the right ear about 7.5 by 7.5 by 3.75 centimetres. He gave a history of syphilis twenty years before and a history of the sores on his lip having been present for two and a half years. He was irradiated after the foul sloughing ulcer in front of the ear had been cleaned up. He showed a definite radiation reaction and it is interesting to note that while the papillary carcinoma of the lip soon healed completely, the infiltrating one despite repeated irradiation showed absolutely no response beyond the preliminary transient improvement and the patient is speedily going down hill.

Regarding the treatment of glands of the neck and the relation of surgery and radiation in the treatment of the intra-oral group of malignant tumours, the conclusions of Quick are worthy of consideration (*Radium Report of the Memorial Hospital*, 1924, page 79):

(i.) The routine block-dissection of the neck in practically all cases of intra-oral carcinoma as generally accepted at the present time is a frantic effort without regard for sacrifices and does not recognize either the natural history of the disease or the various factors which may modify it in individual cases.

(ii.) The cervical lymphatics perform a conservative function in the early course of the disease and to remove them by a routine early block-dissection removes Nature's chief barrier to dissemination, frequently at a time when it is needed most.

(iii.) An expectant plant of treatment which recognizes the natural history of the disease and the natural factors of resistance to it, is an approach toward a more scientific solution of the problem and in no way jeopardizes the best interests of the individual case.

(iv.) The physical agents have demonstrated their worth as a valuable factor in the treatment of this disease and should be used in every case not hopelessly advanced.

(v.) A combination of surgery and radium offers more than surgery alone, once the indication for operative intervention has arisen.

(vi.) The use of local anæsthesia is preferable in all surgery of the cervical lymphatics.

(vii.) A conservative plan of treatment gives promise of reducing practically to a minimum the present immediate operative mortality; of saving patients an appalling number of unnecessary operations and of saving considerable added suffering following many of these operations. This will react to relieve considerably the factors of fear and distrust on the part of the laity and bring patients into proper channels earlier in the course of their disease.

There is a class of basal-celled tumour in which excellent results are obtainable, in many cases by surgery and in most cases by diathermy—I refer to the class recently spoken of as rodent ulcers—but as these methods of treatment are essentially local and not specific, there comes a time in the life history of these diseases when complete removal by either of these methods means extensive mutilation and in many cases a very grave risk. It is here that the particular value of radiation can be shown.

J.F., aged sixty-two years, male, a patient of Dr. Blaxland, gave a history of having had a rodent ulcer of the left side of the bridge of the nose removed by caustics ten years before. He was seen on March 14, 1924. Ulceration had commenced eighteen months before the inception of treatment on the right side of the bridge of the nose close to the inner canthus and had continued spreading. There was present a white scar extending over the whole of the bridge of the nose from the left inner canthus to the right inner canthus, the effect of the original caustics. There was a rodent ulceration occupying the inner half of both lids and, attached at the upper and outer extremity to the superior wall of the orbit, there was a hard mass suggestive of carcinoma. The patient was treated on March 17, 1924, and in three weeks after a fairly well marked local and mild general reaction the whole of the ulceration had healed and the hard mass attached to the orbital plate of the frontal bone had disappeared. There has been no sign of a recurrence a fortnight ago.

F.T., aged fifty-five years, a male patient of Dr. D'Ombrain, was seen on May 8, 1923. He gave a history of a rodent ulcer involving the right eye which had commenced twelve years before and had been operated on by Dr. Bullock in 1921, the eye having been removed and an extensive and successful plastic operation having been performed. Shortly after operation a swelling was noticed over the left inner canthus. This gradually increased and finally blocked the tear duct which now functioned only occasionally. On examination there was a hard nodular swelling about 2.5 centimetres long by 1.25 centimetres broad in the inner angle of the orbit affecting especially the upper half. It was fixed, not tender and was said to be growing more prominent. He was irradiated on May 8, 1923, and had very definite local and general reaction. On June 30, 1923, the swelling was disappearing from the upper portion of the orbit and was spreading inferiorly.

Ten days later he was irradiated again with a further definite reaction. On August 11, 1923, though some of the general reaction had not yet disappeared, the local swelling had entirely gone. On December 6, 1923, the patient presented himself with evidence of recurrence. He was irradiated again on December 12, 1923. The mass disappeared within a month and up to date has shown no evidence of recurrence.

Cancer of the Uterus.

Cancer of the Body of the Uterus.

(*a*) Surgical treatment in cancer of the body of the uterus where there is no involvement of the parametrium gives such excellent results that the removal of the organ should always be carried out unless owing to age or other disability, the operation is put out of court. In such cases treatment by radiation holds out a prospect which would otherwise be denied to the patient. But even if operation

is possible, it is advisable that irradiation should both precede and follow the surgical interference. In those cases in which the parametrium is involved, surgical results are not nearly so satisfactory and the addition of radiation to the therapeutic armament improves the prognosis considerably.

Cancer of the Cervix Uteri.

(b) Cancer of the cervix is in its early stages also amenable to surgical treatment, but safety demands that these conditions too shall receive both pre-operative and post-operative radiations. This is particularly necessary in cases in which the disease has passed beyond the cervix.

Bailey and Heeley reported on twenty-nine patients between 1917 and 1923 who received prophylaxis following hysterectomy. Of these twenty-one were alive and well without any sign of recurrence in 1924. Five have been well for five years.

H.N., aged sixty-eight years, was referred by Dr. Bridges on October 31, 1923, five weeks after hysterectomy for a mass which it was found impossible to remove at operation. The mass was situated to the left posterior aspect of the vaginal vault. On examination it was seen to be the size of a small mandarin, firm, fixed and resistant. She was irradiated three days later and when last seen a fortnight ago, there was no evidence of any of the original trouble (beyond some fibrous thickening) either there or elsewhere in the pelvis.

A.F., aged forty-three years, a patient of Dr. Deakin, was seen on November 6, 1923. She was suffering from carcinoma of the cervix of the uterus and of the left breast. These were treated during November and when seen one month ago the uterine condition had entirely disappeared, but there was still some of the original nodule left in the breast.

A.J., aged thirty-eight years, was referred by Dr. Morton and seen on May 29, 1923. The breast had been removed two years and the glands of the axilla one year previously. In January, 1923, pain began from the buttocks extending down to the knees and when examined she was found to have recurrent nodules over the site of the removed breast and a large number of nodules in the pelvis. The pelvis was treated first in June, 1923, and the patient within three weeks had passed from the state of a bed-ridden invalid into a condition of comparative ease and was now able to walk. The breast area was then irradiated and all the nodules disappeared, but by January 30, 1924, the opposite breast showed evidence of malignant disease, some nodules had returned over the left mammary region and pain had recurred in the left leg. Under further treatment the breast condition cleared up almost entirely and the patient has since then remained in a state in which she grows neither worse nor better, but recently the pain in the knee has become more insistent and the right breast shows well marked evidence of recurrence. Her general condition now is not such as to warrant further drastic treatment.

Figures are given at the Memorial Hospital of New York in connexion with uterine carcinoma which are instructive. Of patients with advanced primary and recurrent cancer taken together, one hundred and thirty-two were treated before January, 1918. There were five alive in 1924. Of seventy-six of these patients treated in 1918, fifteen were alive in 1924; of one hundred and twelve treated in 1919, forty were alive in 1924; of one hundred and twenty-nine treated in 1920, eighty-five were alive in 1924. It is difficult to imagine that these results can be duplicated where a thorough irradiation of the parametrium is not carried out as a routine.

These cases bring us to the question of carcinoma of the breast and here again similar general rules can be laid down regarding irradiation and surgical interference. Patients whose conditions are primarily operative, should have the benefit of both pre- and post-operative irradiation.

Recurrent tumours very seldom show any response to surgical treatment. A number of the patients show a definite improvement in their expectation of life as a result of well planned attack by radiation methods. In the conditions that are on the border line, some may be brought into a condition of operability, but a number will respond so well that operation will be indefinitely postponed. Patients whose conditions are inoperable when first seen, will mostly show considerable improvement in their expectation of life and in their freedom from pain and ulceration if radiation is used.

The figures of two New York hospitals regarding border line and recurrent cases, show that where no radiation was used after operation or for recurrence, the average length of life after recurrence was only one-third as long as in the hospital where radiation was used in both circumstances.

A.G. was seen on April 7, 1923, with a history of having a nodule removed three weeks previously from the left breast by simple incision, the nodule being reported by the pathologist as scirrhous carcinoma. The scar had just healed, no glands were palpable. The patient's condition was excellent. She was irradiated on April 13, 1923, and was seen about June 10, 1924, when there was absolutely no evidence of any recurrence and this, be it remembered, after a simple local excision.

E.C., aged thirty-eight years, a patient of Dr. McPhee, was seen on August 10, 1922. In January, a small lump was noticed on a medial aspect of the right breast. The breast had been removed in June, 1922, by complete operation. It was found to be an adeno-carcinoma. The left breast showed tenderness and general hardness especially in one nodule on the medial side. She was irradiated on August 21, 1922. By October 17, 1922, the mass in the left breast had become much smaller and softer. The right mammary area showed a soft pliant scar. There was no sign of any trouble. In March, 1924, she presented herself with a recurrence the size of a pigeon's egg alongside the internal mammary artery in the second intercostal space. This disappeared completely after irradiation and up to date there is no evidence of return.

Cancer of the Prostate.

Barringer as a result of nine years' treatment of cancer of the prostate with radium points out that in but 2% of cases of carcinoma of the prostate is the carcinoma confined to the prostate and this accounts for the fact that the results of irradiation treatments are superior to those of operative removal both in causing regression of the disease and in coping with urinary retention.

J.A., aged sixty-two years, had a large, hard prostate with definite constant pain, necessitating the use of morphine day and night. He was irradiated on November 17, 1922, and within a fortnight he had lost a great part of his pain. He could walk more freely and was much brighter in himself and the morphine had been reduced by 50%. When his surgeon saw him one month later he reported that the hard prostatic mass had completely disappeared. He died about three months later of mediastinal recurrence.

T.C., aged seventy-four years, had his prostate removed by Sir Alexander MacCormick in 1919. He was all right

until June, 1922, when he developed hæmatemesis and then spurious diarrhœa. There was much mucus in the stools. Seen on July 9, 1923, there was a large mass at the site of the prostate. It was hard, nodular and fixed. His general condition was excellent and he felt very well. After irradiation the mucous diarrhœa became much more pronounced, but subsequently passed off entirely and rectal examination showed very great diminution in the size and in the hardness of the mass. This, too, finally disappeared entirely and when last seen in June, 1924, there was no evidence of recurrence although there was a lot of thickening around the base of the bladder. There had been no return of the symptoms.

Cancer of the Intestinal Tract.

In connexion with carcinoma of the intestinal tract four main types of cases apart from the intra-oral group have to be considered: Carcinoma of the œsophagus, carcinoma of the stomach, carcinoma of the large bowel and carcinoma of the rectum. There was only one case of carcinoma of the œsophagus in which I feel that any definite result has been attained.

R.H., aged thirty-four years, sent by Dr. Forsythe, gave a history of dysphagia of nine months' duration found to be due to œsophageal obstruction at the level of the third dorsal vertebra with ulceration.

Dr. Holmes à Court and Dr. Warren reported the case as inoperable malignant disease. He was seen on September 3, 1922, and on September 5, 1922, he was irradiated. He immediately began to put on weight and one month later there was no radiological evidence of obstruction. The patient's condition continued to improve, but some fourteen months after treatment he against came under observation with a chain of enlarged glands extending from the root of the neck nearly as high as the mastoid process. He was irradiated again and these glands, too, also disappeared. There was no evidence of return of the œsophageal condition. I have heard from him recently and he says he is not feeling well, but he does not complain of any œsophagus trouble and he is to see me before the end of the month.

Carcinoma of the Œsophagus.

A number of cases of œsophageal carcinoma have been treated by internal radiation with radium and external radiation with X-rays, while some have been treated by X-rays only, but in nearly every case with the same history of some transient improvement and opening or partial opening of the obstruction with increase in weight and then within three months a return of the symptoms ushering in the final stage of the disease. There is one other case, however, treated on November 23, 1923, which is different.

J.S., aged seventy-eight years, with a history of six months' hæmatemesis and a complete obstruction at the level of the tip of the xiphisternum with a loss of 7.2 kilograms (sixteen pounds) in weight. Following treatment his ability to swallow was greatly improved and immediately his weight began to rise. He was treated again in January and again in April and now reports his ability to swallow is showing no alteration either for the better or for the worse. Nevertheless I cannot help feeling that it will not be long before the final phase also commences in his case.

Carcinoma of the Stomach.

With cases of carcinoma of the stomach, it is difficult to find in the literature any records of real success. My own experience unfortunately is of the same nature. In some cases there is a disappearance of the clinical symptoms and of any palpable lesion, but this usually only for a short period and then the case once more resumes the original symptoms.

I have at present under observation Mrs. E., a patient of Dr. Greaves, who had a definite palpable pyloric mass which the doctor recently reported to me as having quite disappeared with the vomiting and epigastric distress. Her general condition is, however, very poor, so I have been unable to determine radiologically whether there is at present any active neoplasm.

Carcinoma of the Large Bowel.

In carcinoma of the large bowel the question arises as to whether an immediate colostomy should be performed in order to avert or to relieve impending obstruction. There is the advantage obtained by operation that irritation by the fæces will cease, but an artificial anus is at best a source of great discomfort, so that when we consider that some of these patients can be kept free of obstructive symptoms until metastases determine the fatal issue and that in very few of them is there any hope of the artificial anus being other than permanent, we certainly feel justified in irradiating them while there is no actual evidence of impending obstruction. Could we feel certain of a complete disappearance of the neoplasm, then we would feel more inclined to advise immediate colostomy.

K.K., a female patient of Dr. Cahill, was seen on August 15, 1923, suffering from malignant obstruction of the iliac colon. She was irradiated on several occasions, but gradually developed more and more obstructive symptoms, until finally a colostomy had to be performed. Dr. Moran who operated, reports the condition as having definitely improved.

Cancer of the Rectum.

Surgery in cancer of the rectum leaves much to be desired. My own experience with radiation methods cannot be said to show any improvement except the fact that no patients have died of the treatment. The results obtained, however, do indicate that further evolution in technique will warrant us treating operable, as well as some of the more advanced cases, with reasonable hope of success. I feel confident that a combination of intense radiation followed by surgery will at least increase the post-operative expectation of life for these unfortunate people.

T.C. was sent by Dr. Burfitt with a history of bright melæna for two years. He had a large papillary ulcerating growth on the posterior wall of the rectum filling up the whole of the pelvis. He had lost about 6.3 kilograms (one stone) in weight and had a considerable amount of abdominal discomfort. He was irradiated on February 13, 1923, and when seen again three months later his weight had increased nearly 6.3 kilograms.

His improvement continued until August, 1923, and then symptoms began to return. When seen in January, 1924, the mass which subsequent to the irradiation had almost entirely disappeared, was larger than ever. He was irradiated again, but his history since then has been that of steady downward progression.

This is typical of the history of these cases of rectal carcinoma. In some the response to radiation is longer, in some shorter, but there are none, I think, so far in which the progress has been continuously maintained.

Malignant Disease of the Larynx.

When malignant disease of the larynx is of the papillary type, it responds in a very remarkable fashion to irradiation. In some cases, Dr. Marsh informs me, no local evidence of disease can be found, but in these too there has been in every case a recurrence of the disease either in the glands or in the original focus. There is a risk in irradiating these patients, a risk of causing acute œdema of the larynx. This has in some cases been reported, necessitating tracheotomy. It is perhaps in treating these patients that the fear of such a catastrophe has led to the administration of a dose which was not quite as intense as was necessary. The immediate and almost uniform response of all these cases, however, encourages us to hope that the future will hold out for them a very much brighter prospect than the present.

M.B., aged fifty-five years, a male patient of Dr. Le Fevre, was treated on May 8, 1923. Seventeen months previously he had developed a small swelling of the throat, causing dysphagia, succeeded nine months later by dysphonia. He had a cauliflower tumour on the right arytenoid and a large gland on the right side of the neck. One month after treatment Dr. Le Fevre reported that the growth was much smaller and that the patient had put on a little weight and that there was no dysphagia. He was irradiated again on October 2, 1923, for a recurrence of his symptoms and an increase in the size of the mass. Dr. Marsh saw him subsequently and reported that the growth had practically disappeared while the glands in the neck could not be felt. On February 5, 1924, his symptoms had returned and his fatal downward progression had commenced.

Sarcomata.

As regards the most malignant type of sarcomata, the melanotic, I can find in the literature only one case reported as being clinically cured. This was a case of the orbit in which irradiation was employed. The most that we can expect in these cases is some temporary cessation of the growth, especially if the spreading is limited to the lymph nodes, but in the generalizing forms the area requiring an attack is usually much too extensive for anything to be attempted at present.

Sarcomata of the Soft Tissues.

In sarcomata of the soft tissues the disappearance of the small round-cell sarcomata are sometimes very striking. Large masses of new growth shrink very rapidly and leave no clinical evidence of disease.

Mrs. C., aged seventy-four years, a patient of Dr. Weihen. In June, 1921, a lobulated mass reaching to the edge of the orbit was shelled out completely except for some adherence to the bone near the inner canthus. Microscopically it was diagnosed by Dr. Finckh as a round-celled sarcoma of the less malign type. Some fibrous thickening formed over the site of the scar and was removed by the application of radium. She remained apparently well until March, 1923, when she began to develope some obstruction in the nostril and by May, 1923, she had a mass filling up the anterior and posterior leading into the posterior and anterior ethmoidal labyrinths (Dr. Halloran). A small area on the anterior surface of the mass was ulcerated. She was irradiated on May 11, 1923. On May 19, 1923, she was in the middle of a violent reaction, but stated that the nostril already felt considerably freer. By June 9, 1923, one month after the treatment, reaction had subsided. The nose was perfectly free and Dr. Halloran reported that no trace of the original mass could now be seen. She was seen again several months later and her condition was still excellent. I have not seen her since and I presume that her condition still remains satisfactory.

W. McL., aged sixty-three years, was sent by Dr. Marsh. The patient had a sarcoma of three months' duration involving the post-nasal space, obstructing the right nostril and depressing the soft palate. He was irradiated through three ports of entry on October 12, 1923, and developed subsequently a mild local and a very mild general reaction. He noticed improvement in eight days and on November 19, 1923, three weeks after treatment, Dr. Marsh reported an improvement. There was, however, still some new growth about and in front of the Eustachian tube. Further irradiation was carried out on December 5, 1923, and the growth completely disappeared. On April 10, 1924, a recurrence was observed on the right side of the soft palate and was irradiated four days later. In eight days it had completely vanished and there was no history of further trouble.

Master S., aged ten years (Dr. Greaves) was seen on October 5, 1923, with a mass the size of a large orange just above the iliac fossa which had been present for four weeks. It was very hard, firmly fixed to the posterior abdominal wall, but evidently not invading the peritoneal cavity. It was growing very rapidly. He was irradiated without result, but the mass ceased to grow. In January, 1924, he was irradiated again and the mass apparently shrunk, but very slightly. Further irradiation was carried out in March and within three weeks the mass had entirely disappeared. There is now no sign of any further trouble.

M.T., aged seven years, a patient of Dr. Bridge, was seen in December, 1923, with a lump on the forearm of three months' duration and with a diagnosis of sarcoma. Despite advise against operation the arm was amputated at the junction of the middle and upper thirds of the humerus. Within six weeks after the operation, a lump occurred in the axilla. This grew slowly, but continuously and some two and a half months after its appearance the patient was irradiated. The mass of glands disappeared leaving only a fibrous cord. The patient subsequently developed an intense pain along the last dorsal and first lumbar nerves and although no gross evidence of metastases could be determined radiologically or otherwise, it was thought that the origin of the pain was certainly neoplastic and the lower half of the dorsal portion of the spine and the upper half of the lumbar region of the spine was irradiated. There was immediate cessation of the pain within twenty-four hours and it has not returned since.

Sarcomata of Bone.

Giant-celled tumours gradually recede when a patient is treated by external radiation. Round-celled tumours diminish rapidly, but in these cases the prognosis is not so good because of the possible presence of multiple lesions and metastases.

A.E.R., aged sixty-two years, male, was one of Dr. Morton's patients. He had a lump on the right shoulder of two years' duration. When seen on August 28, 1923, he had a huge swelling occupying the whole of the right shoulder region, hard, extremely tender and causing constant pain, made excruciating by movement due to the presence of a pathological fracture of the upper extremity of the humerus in the presence of the sarcoma. It was most difficult to get the patient to remain still sufficiently long for irradiation, so constant was the pain. Eight days after treatment the pain had disappeared and within a short time I was able to detect radiologically the formation of new bone where previously there had been continuous increasing destruction. The patient's condition gradually improved and he now exhibits a complete bony union. This case is interesting as showing the possibility of regeneration of bone apparently completely destroyed by a neoplasm.

Osteogenic sarcomata generally resist external radiation, but some of the tumours of this class may have their progress stopped by physical methods.

Master G., a patient of Dr. Yuille, had an osteogenic sarcoma of the mandible and was treated, with no results except the cessation of growth. He was irradiated again and since then, the growth has shrunk considerably, but a large amount of the new bone formation is still present. What the ultimate outlook may be, is impossible to say, but there is no doubt that the malignant process has been at least very heavily checked.

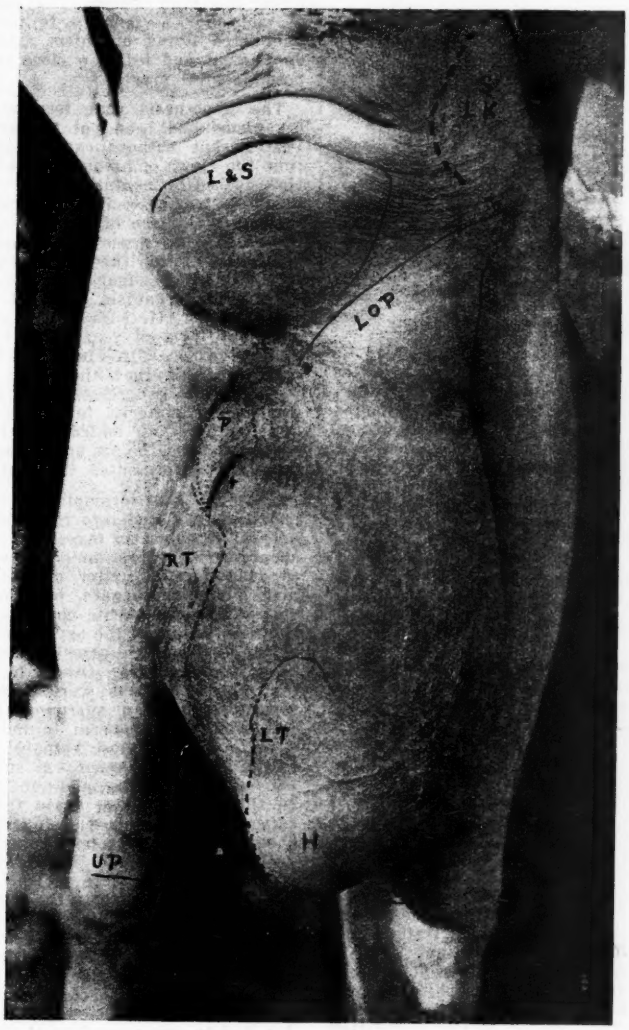
Conclusion.

In summing up the effects of irradiation upon tumours we find that the law of Bergonié and Tribondeau holds good:

> Tumours composed of rapidly multiplying cells, especially those of the embryonal type and particularly those of the lymphoid group, are highly susceptible to radiation and in such ratio as the above characters are developed.

One big asset that radio-therapy has is the fact that while it is not painless, it has no appreciable death rate and people will more readily submit to it, therefore, than to the knife and will do it earlier.

The treatment of suspicious and precancerous lesions will be easier to enforce, if simple methods of radiation will secure the desired result and the fear of the knife and its consequent deformities, dispelled.



LEFT INGUINAL HERNIA.

L. and S. = Liver and Stomach prolapsed. S.L.K. = Spleen and Left Kidney prolapsed. L.O.P. a—b = Left opening of Peritoneum through which Intra-abdominal Structures have herniated. P. = Dorsum of Penis. +. = Lower Edge of Prepuce. The glans and body can be drawn through the preputial orifice. R.T. = Right Testicle. L.T. = Left Testicle. H. = Hydrocele. U.P. = Upper Limit of Patella.

Reports of Cases.

LARGE LEFT INGUINAL HERNIA.

By J. B. NASH, M.L.C., M.D., M.S. (Edinburgh),
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About 7 p.m. on April 6, 1924, I was called to Lidcombe to see a man with irreducible hernia accompanied with severe pain. He was a man, aged eighty-four years, who had had an inguinal hernia for fifty years. It had never been reduced. For some hours he had complained of severe pain in the prolapse. Should he be operated?

The illustration makes apparent the following signs. The belly wall from the margin of the costal arches to a line drawn from side to side just below the umbilicus, was retracted and lies against the aorta and the lumbar recesses. The liver and stomach were prolapsed to the right iliac and suprapubic abdominal areas. The spleen and left kidney were ptosed to the iliac crest and the iliac region. The opening into the hernial sac was above Poupart's ligament from the symphysis to the left anterior superior iliac spine. The scrotal coverings were pushed down to a tranverse line joining the upper limits of the patellæ, the distance from upper edge of *symphysis pubis* to lowest point being thirty centimetres (twelve inches); laterally the hernia covers the inner third of the right thigh and the inner two-thirds of the left thigh, the circumference at its greatest, fifteen centimetres (six inches) below the upper edge of the symphysis being 62.5 centimetres (twenty-five inches), the projections of the dartos are the dorsum of the penis, the right testicle, the left testicle and a hydrocele of the left *tunica vaginalis*. The contents of the peritoneal sac are the omentum and coils of bowel. In these coils peristalsis was taking place and the contained gas was moving freely inwards and outwards through the neck of the sac.

Operation was not performed because of: (*a*) the ligaments and the mesenteries of the abdominal contents must be drawn away from their attachments to the abdominal wall; (*b*) the ptosed and herniated viscera could not be replaced within the contracted belly wall; (*c*) the fifty years' history of the hernia and (*d*) the advanced age of the patient.

Lidcombe State Hospital is noted for the long history, the size and the complexity of the abdominal hernias in the patients who are admitted to the surgical ward. We seldom see a bubonocele or one of its near relations, while none has been so large as the one here figured. Large numbers have been operated during the just ended eleven years. Those operated from June, 1920 to December, 1922, are set out in the attached table. They give a fair idea in every way of the cases.

HERNIA OPERATIONS (June, 1920 to December, 1922).

Variety of Hernia.	Number.
Inguinal	46
Ventral	2
Recurrent	2[1]
Strangulated	5[2]
Total	55

[1] The original operation was performed elsewhere.
[2] The ages of the five patients were 54, 57, 58, 72 and 85 years. All recovered from the operation. In one, portion of the gangrenous bowel was resected.

Reviews.

THE WORKS OF PASTEUR.

THE centenary of Pasteur—he was born in December, 1822—has been made the occasion for the publication of a collected edition of his works, the first two volumes of which we have received.[1] The achievements of Pasteur fall into six great divisions and to each of these a volume is to be devoted. The first contains in chronological order the record of his early chemical studies, chiefly concerned with the problems of molecular asymmetry. In the second are collected his papers on the fundamental nature of fermentative processes and those in which he refuted the theory of spontaneous generation. Other volumes will contain his studies on the commercially important fermentations, on disease of silkworms and on infective diseases in man and animals.

Though his later and more widely known researches are not included, the present volumes show clearly the great characteristic of Pasteur's work, its intellectual continuity. From his first thesis presented in 1847 on the rotation of polarized light by solutions of tartrates, each investigation leads on steadily to the unfolding of that series of discoveries that laid the foundations of biological science and particularly of scientific medicine. Each problem solved presented a new question to be attacked. In his first paper he pointed out that the isomorphous tartrates of sodium and ammonium possess an equal rotatory effect on the plane of polarized light and a conception of the relation between the crystalline form and optical properties of aqueous solutions was already forming in his mind. Then the statement of Mitscherlich that tartrates and paratartrates were identical in composition and in crystalline form, yet possessed essentially different rotatory powers, provoked a painstaking crystallographic study of these salts. Within a few months he was able to lay before the Academy a brilliant demonstration of the association of crystalline and hence molecular asymmetry with the power to rotate the plane of polarized light in solutions. The inactive paratartrate was separated into crystals of two sorts that showed asymmetric facets—some to the right, some to the left—so that the one type was the mirror image of the other. Each form of crystal when dissolved gave an optically active solution, but the directions of rotation were opposite and when equal amounts of both crystals were dissolved together, the solution showed the characteristic inactivity of the paratartrate.

The next few years were occupied in related investigations particularly in regard to the interconversion of the active and inactive forms of the tartaric acids. These substances were chiefly obtained from wine residues and it was natural for Pasteur to study the effects of various fermentations on the acids. He found that the dextrorotatory form was readily destroyed by fermentation while the laevo-acid was relatively unaffected, so that it could be isolated in this way from the inactive racemic mixture. Also a mould *Pencillium glaucum* possessed this same power to a high degree. This indication of the importance of molecular asymmetry to nutritional processes in an undoubted living organism made a profound impression on Pasteur and led to a close study of fermentation as a possible vital process.

The hypothesis that fermentation is due to living organisms had been put forward not infrequently before Pasteur but without experimental evidence and at that time the views of Liebig were almost universally accepted. He ascribed fermentation to a "communicable vibration of unstable fermentescible molecules" that rapidly spread through a solution of sugar or other susceptible substance in which the process commenced. The experimental refutation of this theory and the proof that the alcoholic fermentation of sugar was a manifestation of the activity of a living organism occupied Pasteur during the years 1857 to 1863. He showed that a sugar solution inoculated with one form of yeast gave rise to alcohol and carbon dioxide, while with another ferment lactic acid was the chief product: that the yeast increased in amount as fermentation progressed and required the presence of nitrogenous material for its growth or chemical activity and finally that boiled solutions of sugar, carefully protected from the air and other sources of contamination, remained unfermented indefinitely.

The proof that fermentation was due to micro-organisms usually introduced into the solution from the air had its natural sequel in an investigation of the whole question of spontaneous generation. It was common knowledge that in dead animal matter minute living organisms rapidly made their appearance, but the question of their origin was a matter of acute controversy. Gay-Lussac had held that the contact of the oxygen of the air with many organic substances was responsible for producing the micro-organisms observed. Others following Spalanzani believed that the organisms were derived from like organisms present in the air or surroundings. Interest in the problem was sufficiently general to induce the Academy to offer a prize for the most valuable experimental contribution to the subject. Pasteur was successful with his "*Memoire sur les corpuscles organisés qui existent dans l'atmosphère.*" In this work we see again the methods of thought and experiment that had laid the broad foundations of chemistry and physics, being applied to a biological problem of the first importance. As in all Pasteur's writings there is here no spectacular intuition of truth, only a complete faith in the experimental method, a power of seeing with absolute clarity the essentials of an experiment and a tireless persistence to overcome any technical difficulties that hindered his attaining the rigidly controlled experimental conditions he desired. These qualities enabled him in the course of this study to evolve much of the fundamental bacteriological technique of the present day and to prove conclusively that spontaneous generation under conditions now existent never occurs.

Apart from these classic studies numerous papers on related subjects, some important, some in the light of present knowledge trivial, are included in the two volumes, but all show the same clear-thinking dependence on the experimental method.

Pasteur possessed none of the genius of a Newton; his work followed a logical, inevitable evolution that seems almost independent of the man himself. His unique position in the history of science is almost entirely due to his intense faith in the applicability of the experimental method to biological problems. The practical results of Pasteur's work form the greatest gift any one man ever made to humanity, but his demonstration that rigidly controlled experiment is as productive of clear knowledge in the study of life as in the realm of chemistry, is his greater claim to immortality.

[1] Œuvres de Pasteur, Réunies par le Docteur Pasteur Vallery-Radot (Collection des Thèses et des Mémoires scientifiques en sept volumes); 1922. Paris: Masson et Cie: Demy 4to.; Tome Premier: Dissymétrie Moléculaire, pp. 480. Price Frs. 50 net; Tome Deuxième: Fermentations et Générations Dites Spontanées, pp. 664. Price: Frs. 65 net.

The Medical Journal of Australia

SATURDAY, AUGUST 30, 1924.

Specialists in Conclave.

Progress in science depends on research. Research in the clinic, in the laboratory, in the field and in the sick room of private patients opens up an immense field for the widening of medical knowledge. While it is given to every medical practitioner to add something to medical knowledge, the didactic value of observations and investigations undertaken without guidance necessarily depends to a large extent on the facilities available for ascertaining what work has been previously carried out. Unfortunately the medical profession in the Commonwealth is badly supplied with medical libraries. Recent medical journals and proceedings of medical societies are accessible to relatively few. This fact is not only disadvantageous in regard to original study; it also handicaps the medical practitioner in his daily work, since he is thus deprived of the application of recently acquired information, unless other means are provided to bring this knowledge to his door. At the present time various means are employed to inform the whole profession concerning the doctrines that are receiving favourable consideration. Post-graduate courses are held in the larger States each year. Every few years a congress is held and in the case of the first session of the Australasian Medical Congress (British Medical Association), Melbourne, 1923, the transactions have been published in supplements to this journal, so that every member of the British Medical Association in Australia can study them at his leisure. All the Branches of the Association hold frequent meetings at which subjects of immediate importance to the general practitioners are discussed, and the records of these meetings appear in these pages. Within the last few years there has been a tendency of those who practise special branches of medicine, to form societies or groups for the purpose of discussing work that has recently been carried out in connexion with these specialties. The societies that have a detached existence and that hold their meetings with closed doors, have relatively little importance for the medical profession as a whole. It is admitted that the members of these societies benefit considerably as a result of the discussions and that their work is improved thereby. Research workers have found it advisable to form private clubs or debating societies in England and elsewhere at the meetings of which unfinished work is criticized and helpful suggestions are made. These debates are not published. But the members of these clubs ultimately publish their work and in this way it becomes common property.

The medical community in Australia is too small for organizations of this kind to become general. In addition the need of the isolated practitioner for as much assistance as it is possible to bring to him, renders it eminently advisable to adopt methods calculated to disseminate knowledge as widely and as rapidly as possible. The best expedient yet devised is the formation of special sections of the Branches of the British Medical Association. Readers will have noted that many new special sections have been formed this year, notably in the New South Wales Branch. While membership of these sections is open to all members of the Branch, few who are not specialists, will be tempted to join. The discussions gain in value by the fact that each speaker has devoted time and study to the particular branch of medicine with which the section is concerned. As much space in this journal as can be spared will be reserved for these discussions, in order that the views of specially trained practitioners may be available for all. Within a short time the printing arrangements of the journal will be materially expanded and it will then be possible to give more room to this excellent method of teaching. But the value of these meetings and debates need not stop with the publication of the records. Those who have messages to give and who are prevented by reason of distance or lack of opportunity from joining the sections, can deliver their contributions through our correspondence column. We urge medical practitioners in all parts of the Commonwealth to use the journal very freely for recording clinical observations. While delay usually

occurs in the publication of articles extending over several pages, room can be found for reports of cases within a short time. The publication of clinical records is of real value in connexion with the elucidation of ætiological, pathological or therapeutic problems, since sound hypotheses are those that are built on the solid foundation of fact. We therefore applaud the spread of the movement and recommend the establishment of special sections of the Branches of the British Medical Association as one of the best means of contributing to progress.

Current Comment.

THE DANGERS OF ADRENALIN.

Extracts of supra-renal gland tissue are employed in surgical and dental practice and also in general therapeutics without much regard to the warnings of physiological experiment and of clinical experience. Several years ago the attention of the medical profession was called to the risk incurred when adrenalin was given to a patient during or immediately after anæsthesia with chloroform had been induced. The vaso-constrictor effect of adrenalin appears at times to be very desirable and convenient and it is easy to understand how a practitioner may forget that this action is extremely dangerous to life in the presence of chloroform or, being aware of the risk, may be inclined to regard it as less serious than it is supposed to be. This is not the only danger attaching to the preparation. The active principle or hormone of the supra-renal bodies is nicely adjusted to the needs of a normal, healthy individual. In certain pathological processes of the thyreoid and possibly of other glands of internal secretion the balance is not maintained and an excessive output or artificial supply of the secretion may readily give rise to symptoms of a serious nature. Goetsch pointed out in 1918 that it was possible to differentiate between hyperthyreoidism and tuberculosis by watching the effect of the injection of 0.45 cubic centimetre of a 1% solution of adrenalin chloride. The person suffering from hyperthyreoidism reacts with an increase of blood pressure and of pulse rate and manifests a consciousness of the heart's action, asthenia, a feeling of dread, tremor, pallor, flushing and some sweating. These symptoms appear within a quarter of an hour of the injection and cannot be regarded as other than grave. It is assumed that the increased sensitiveness of the sympathetic nervous system is augmented by the adrenalin. Whether it is or is not justifiable to employ adrenalin as an agent in the differential diagnosis of hyperthyreoidism and tuberculosis is a moot question. According to Dr. H. E. Symes-Thompson the test should not be applied unless adequate precautions are taken to ascertain whether a considerable idiosyncrasy to the drug exists.[1] He records a few accidents that have resulted from the use of adrenalin in dental surgery and refers to others previously recorded. A married woman said to be of nervous stability was given an injection of 0.03 gramme of "Novocaine" in 2.25% solution together with 0.00003 gramme of "Suprarenin" (equivalent to 0.015 cubic centimetre of a 1‰ solution of adrenalin). The injection was made for the purpose of inducing local anæthesia prior to the extraction of two teeth. Almost immediately the patient was seen to be limp and complained of chilliness. She then became very agitated, had severe palpitation, rapid, panting breathing, flushing of the face and tremor of the arms and legs. Later she had difficulty in standing. Recovery followed within a short time. He is satisfied that these alarming symptoms were produced by the adrenalin in a sensitive person. The dose was small and the preparation, a synthetic one, much less active than the ordinary extract. In order to obviate this danger, he recommends the use of very weak solutions or the avoidance of adrenalin altogether. It has been found that adrenalin in a dilution of one part in 200,000 has a good ischæmic action. On the other hand "Novocaine" can be given with safety in large quantities and the need for adrenalin would seem to be doubtful. Braun had not observed any ill effects after injecting one or two hundred cubic centimetres of a 0.5% solution of "Novocaine."

Dr. Symes-Thompson records a tragic happening which strengthens his case against adrenalin. A young woman had slight symptoms of Graves's disease and had a goître of considerable size. She desired the removal of her thyreoid gland for æsthetic reasons. A preliminary injection of "Omnopon," scopolamine and atropine was given and one hour later sixty-five cubic centimetres of 0.3% solution of "Novocaine" with two cubic centimetres of 0.1‰ solution of adrenalin were injected locally. There was no evidence that the fluid entered a vein. Twelve minutes later she vomited. Her face then became blue, the corneæ were found to be insensitive, the pupils dilated, the respiration gasping and the pulse almost impalpable. Respiration then ceased and all attempts to resuscitate her failed. The extreme danger of giving a large dose of adrenalin to a person suffering from Graves's disease is well exemplified by this record. The author's claim that even small doses may produce serious and at times permanent effects should be regarded as a timely warning against the careless use of this potent substance.

[1] *The Lancet*, April 12, 1924.

APLASTIC ANÆMIA.

It is a well known fact that in the condition known as pernicious anæmia, when the process of blood formation appears to be exhausted, the bone marrow is generally a dark red colour and is crowded with nucleated red blood corpuscles. This has been regarded as a reactive hyperplasia or metaplasia on the part of the marrow in response to the enormous demand for new red cells to replace those destroyed in the course of the disease. There is, however, a type of anæmia very similar to perni-

cious anæmia in which the marrow does not manifest such response; there is an atrophy of the erythroblastic tissue in the marrow. To this condition the name of aplastic anæmia has been given. It differs in several respects from typical pernicious anæmia. It is a disease which occurs more frequently in young persons and the greater number of these are women. It runs a rapid course and is not characterized by remissions. Hæmorrhages are seen much more often than in true pernicious anæmia. The hæmatological findings are striking. Nucleated red cells, both normoblasts and megaloblasts, are usually absent. As a rule there is no poikilocytosis, anisocytosis, polychromatophilia or stippling. The leucocytes are reduced in numbers, polymorpho-nuclear cells including eosinophile cells are those most affected and the latter may be practically absent. There is thus an increase in the percentage of lymphocytes. The colour index is usually low; in nineteen cases collected by Cabot it averaged 0.8%. Lastly the blood platelets are much reduced in numbers. This reduction is much more constant than that seen in true pernicious anæmia. The deficiency of platelets is held to account for the hæmorrhagic tendency manifested in some patients affected by the disease. At *post mortem* examination characteristic changes are as a rule found in the bone marrow. The erythroblastic tissue has generally disappeared and the interior of the bone has assumed a yellow appearance due to the presence of fat. It is well to remember that this yellow appearance may be seen in the marrow in other conditions. In the anæmia which so frequently accompanies the latter stages of malignant disease, the same yellow appearance is seen. Nor is the red appearance always found in the marrow of persons dead of pernicious anæmia.

An extremely interesting communication on the subject of aplastic anæmia has recently been made by Dr. S. C. Dyke.[1] In the first place Dr. Dyke refers to the work of Frank and to the fact that he named the disease aleukia as indicating the actual and relative decrease of the polymorhponuclear leucocytes. He also quotes Frank's views that the condition depends on a primary deficiency of the hæmato-poietic system and that when evidence of infection appears on the face of the blood picture of aleukia, the infection must be regarded as secondary to the damaged state of the hæmatopoietic system. Dr. Dyke gives in some detail the clinical histories of five patients who suffered from the disease. In all there was a diminution, both actual and relative, of the polymorpho-nuclear leucocytes and there was a tendency to hæmorrhages. In three the blood platelets were considerably decreased. Four of the patients died and in three of them an autopsy was carried out. It is not necessary to describe the histories in detail, but the *post mortem* findings were important. In one instance the characteristic greyish colour was found in the ribs, sternum, diploe and right ulna, but in the left femur a distinct red colour was noted. This was not similar to that seen as a rule in pernicious anæmia. It was due to hæmorrhage in the medullary cavity of the bone. In the hæmorrhagic areas clumps of streptococci were found. The same organisms were also found in the spleen. In a second instance the bone marrow of the femur was dark red and semi-liquid. This was caused by hæmorrhages and in the hæmorrhagic areas coliform organisms were found. These organisms were also found in the spleen and in sinuses throughout the organs. In a third instance the patient originally suffered from myeloid leuchæmia. In the later stages the blood picture became that of aplastic anæmia. The spleen had been treated by exposure to radium. Examination *post mortem* revealed the presence of a miliary tuberculosis and in the only bone examined, the femur, extensive involvement of the marrow by the tuberculous process was found. Dr. Dyke points out that in three out of four instances it was possible to demonstrate an infection of the bone marrow after death. He states that on the face of it it would appear reasonable to attribute the clinical condition to the infection of the bone marrow. He thinks that some doubt is thrown on this view by the history of the fifth patient. In this patient the condition of aleukia "seemed to be inherent, though subject to fluctuations." The red cells were not diminished to an abnormal extent, but the blood platelets were very deficient and petechiæ occurred at one stage in the illness. An increased bleeding time was noted on pricking the skin to obtain samples of blood. Occult blood was present in the stools. Dr. Dyke states that the blood picture in this patient would seem to indicate an inactive condition of the hæmatopoietic system. He also thinks that it is not difficult to believe that such a hæmato-poietic system would offer but little resistance to infection and that in the face of an infective agent, no matter of what nature, the patient might readily pass into the condition exemplified in the other four reported by him. Dr. Dyke considers that the condition of the fourth patient who originally suffered from myeloid leuchæmia and at whose autopsy miliary tuberculosis was found, seems to afford some evidence for the belief that in all the cases described the bone marrow may have been in an unhealthy condition prior to its infection. In the history as set out, however, there is no evidence as to when or how the tuberculous infection occurred. The bones would certainly be affected in a miliary tuberculosis infection and, moreover, only one bone was examined at autopsy. Dr. Dyke thinks that some evidence is afforded that the bone condition may be primary to the infection by the fact that in one of the autopsies conducted by him the marrow in some bones, not the seat of an infective process, was dry and colourless as is usually found in anæmia of the aplastic type.

Dr. Dyke evidently is inclined to accept the explanation offered by Frank in regard to the infection of the bone marrow, though he does not definitely say so. He has stated, however, that it is reasonable to attribute the blood picture to infection of the bone marrow. It still remains to be proved that this is not so.

[1] *The Lancet*, May 24, 1924.

Abstracts from Current Medical Literature.

DERMATOLOGY.

Dermatological Aspects of Rat Bite Fever.

PAUL O'LEARY (*Archives of Dermatology and Syphilology*, March, 1924) states that the value of the cutaneous lesions in rat bite fever as an aid to diagnosis is in the majority of instances about as great as in pellagra and early syphilis. *Spirochæta morsus-muris* according to the authors who consider it to be the underlying cause, is found in the blood in the first few weeks of infection. It appears in the capsules of the lymph glands, mucous membranes, in the salivary glands and in the parenchymatous organs. The organism is inoculated by the bite of a rat, mole, cat, dog or ferret and is probably transmitted by the saliva at the time of the bite. A variable incubation period, twelve to thirty days, is followed by constitutional symptoms and the exanthem of the disease. The exanthematous phase may be mild or severe, appearing as a roseola, indurated erythematous plaques, lesions of the mucous membranes and alopecia. The most typical cutaneous lesion of rat bite lever is the indurated bluish-red plaque. These vary in diameter up to twelve or fourteen centimetres and are characterized by a lighter coloured concentric zone just within the margin. These lesions are usually not symmetrical, they are widely distributed and variable in size. Fresh lesions appear with each exaccerbation of fever. Patches of alopecia and general thinning of hair persist until treatment arrests the process. A reaction to the Wassermann test was obtained by the author in two instances. The differential diagnosis of the local reaction may include pyogenic cellulitis, giant chancre and erysipelas and on the basis of the constitutional symptoms, malaria, relapsing fever and trench fever. Treatment consists in the intravenous injection of one of the "Arsphenamin" group of drugs in usual doses.

Lupus Vulgaris.

K. A. HEIBERG and SVEN LOMHOLT (*The British Journal of Dermatology and Syphilis*, June, 1924) state that experience in the Finsen Light Institute in Copenhagen has shown that it is possible to cure 85% of all patients with *lupus vulgaris* by the use of concentrated local carbon arc light, when this is aided by universal carbon arc light baths. The remaining 15 % of patients can be placed in two groups. The first group consists of a few in whom the condition is widespread and neglected. In these the lesion spreads so rapidly that light treatment with its slowly obtained results cannot keep pace with it. The second group contains a larger number in whom small nodules persistently return in the scattered scars, the cause of this being the depth of the nodule and the difficulty of the light in penerating scar tissue. The authors made a study of forty-three patients in whom relapses had occurred, and arranged them according to the depth and breadth of nodules. They found that in a large proportion of these relapsing conditions the nodules went down to a depth of 1.5 millimetres. The fact that 0.7 millimetre is the greatest depth below the surface of the skin at which histological changes are observed after a single light exposure, would account for the non-destruction of these deep seated nodules and hence for the relapses.

Pemphigus.

ROBERT H. AND WILLIAM D. DAVIS (*Archives of Dermatology and Syphilology*, November, 1923) give a brief summary of the treatment of pemphigus by various authorities and present a treatment consisting of intravenous injections of iron cacodylate 0.06 gramme to five cubic centimetres of the vehicle. The injection is given three times a week with the addition of a subcutaneous injection of 1.5 cubic centimetres of "Coagulen" on alternate days. In all instances except one the latter was given on the same days as the iron and arsenic solution. The results of this treatment they claim to be extraordinarily good.

Sarcoma.

C. W. FUMERUD (*Archives of Dermatology and Syphilology*, July, 1924) states that two or three instances are on record in which bone tumours, single and multiple, developed independently in the skin of young persons. These tumours have probably been the result of the growth of misplaced embryonal cells. The author reports an instance of true bone formation in the skin, the result of metastasis of an ossifying sarcoma of the upper end of the right humerus.

Desensitization.

F. LEE BIVINGS (*Archives of Dermatology and Syphilology*, May, 1924), reports the successful desensitization and treatment of persons suffering from poisoning by "poison ivy" and "poison oak." Treatment consisted either in hypodermic injection of the antigen or oral administration of the tincture. Doses were given daily until all symptoms had disappeared. The average condition of poisoning required injections at only twenty-four hour intervals. In the most severe conditions injections and oral doses were given as often as every eight hours. The dose varied according to the severity of the condition and the area involved. Patients suffering from a mild form of poisoning were given the tincture only without hypodermic injection. Those with more severe rash and considerable itching were given minimum doses of 0.3 cubic centimetre (five minims) of the antigen *Rhus toxicodindron* with one cubic centimetre of the tincture by mouth. The dose was increased to as much as one cubic centimetre by hypodermic injection and two cubic centimetres by mouth. The average length of time required for relief was thirty-six hours or twelve hours following the second injection.

Psoriasis.

MAX SCHEER (*Archives of Dermatology and Syphilology*, May, 1924) in reporting an instance of psoriasis of the mucous membrane of the lips quotes several authorities in support of his diagnosis. He regarded the condition as psoriasis of the mucosa on clinical grounds. Cheilitis could be definitely excluded and the appearance was not that of *lichen planus*. There was no atrophy and the scales were not adherent as in *lupus erythematosus*. Lesions of the skin were definitely psoriasis, although histological examination of the mucosæ was not regarded as adding weight to the clinical evidence.

Coccidioidal Granuloma.

DAVID J. DAVIS (*Archives of Dermatology and Syphilology*, May, 1924) reports the results of a detailed investigation of a condition of coccidioidal granuloma together with certain serological and experimental observations. Amputation of both feet of an affected patient was performed in an attempt to control the infection. Old lesions tended to heal with considerable scarring, while new lesions appeared in other parts of the body. There was no vesical involvement. In the extremities the infection involved skin, muscle, ligaments, fascia and bone. The author points out that from the character of the lesions and the distribution blood dissemination would be suspected. *Coccidioides immitis* were constantly found in smears and cultures. An intradermal skin reaction was obtained with killed homologous organisms. The reaction was decidedly more intense than that following the injection of sporotrichin, blastomycin or agar. In guinea pigs an infection may be produced by a superficial injection of the organism. This infection in its general course and chronicity are comparable to those in man.

Pruritus.

T. F. MONTAGUE (*Archives of Dermatology and Syphilology*, July, 1924) has carried out a bacteriological research on pruritus of the perineum, *pruritus ani, vulvæ* and *scroti*. He refers to a statement by another author that 80% of patients suffering from these various forms of pruritus had an infection of the skin covering the affected parts. This infection was held to be caused either by the colon bacillus, the *Streptococcus fæcalis* or both together. The author states that such a statement regarding the demonstration of infection cannot be assumed on the proof offered. He undertook a series of bacteriological examinations in order to ascertain to what extent the findings of previous writers could be corroborated. He concludes that when the epidermis is injured

by traumatism or maceration, an invasion of bacteria may occur. This invasion is modified either by the resistance of the cells or the low virulence of the invading organism. The organisms responsible were found to be staphylococci and the *Bacillus coli communis*.

RADIOLOGY.

Colonic Radiography.

W. H. STEWART (*American Journal of Roentgenology*, February, 1924) points out some of the pitfalls in the X-ray diagnosis of colonic lesions and offers suggestions as to the proper method of overcoming them. Thorough preparation is essential and the author recommends compound liquorice powder as an effective laxative to be given on the third and second nights before the examination but not on the night preceding examination. In this way spasm and awkward peristalsis are avoided. On the morning of examination the colon is irrigated with warm water. Soap enemata should be avoided. Preliminary skiagrams are taken before giving the enema. The author insists on the introduction of the tube being made carefully in a good light, thus irritation and injury to hæmorrhoids *et cetera* are avoided. The enema recommended consists of barium sulphate about one hundred and twenty grammes suspended in half a litre of mucilage of acacia and half a litre of hot water. Gas in the enema tube should be avoided and the enema run in very slowly; a greater height than twenty-five centimetres above the abdominal wall level should not be used. If the patient feels uncomfortable the can should be lowered and the spasm and desire to defæcate will pass. Generally the caecum is reached in five minutes and the injection should then be stopped. The colon may be palpated under the screen and necessary skiagrams taken.

Treatment of Cancer.

H. J. ULLMANN (*American Journal of Roentgenology and Radium Therapy*, March, 1924) reviews the treatment of cancer by radiation. New remedies are looked on as the panacea of all ills and the tendency is to use methods of treatment which save the physician thought and labour; but treatment cannot be standardized and the individual must always be studied. In deep radiation it was thought that once the diagnosis was made a "carcinoma" dose or a "sarcoma" dose could be measured out to the tumour and the patient not considered. Such treatment has led to many disasters. Individual differences in reaction occur while tissue and tumour reactions are by no means constant; attempts to substitute physics for biology and medicine have proved obstacles to sound progress in radiotherapy. The stage at which cancer cells are most vulnerable is during mitosis and so it is being more generally accepted that smaller repeated doses are more likely to catch tumour cells in this stage than is the greater massive dose. Many authorities have proved that after very intensive radiation of animals their susceptibility to inoculation with rat carcinoma is greatly increased.

Infection in Arthritis.

L. J. CARTER writes on gastro-intestinal foci of infection in chronic deforming arthritis with radiological study of a series of patients (*American Journal of Radiology*, December, 1923). Under the term of chronic deforming arthritis are included rheumatoid arthritis and osteo-arthritis. The former mainly affects the soft structures and cannot always be demonstrated radiologically. Its onset is fairly acute and it is polyarticular, while osteo-arthritis primarily affects the cartilages and bones and osteophytic outgrowths occur. The onset of osteo-arthritis is usually insidious and affects the larger joints and vertebral column. The author was able to demonstrate gastro-intestinal lesions in 81% of individuals affected by chronic deforming arthritis. This percentage is quite apart from the patients with tonsillar, dental or nasal affections. The author has been struck by the number of cases in which intestinal bands were demonstrated and he points out that bands are easily removed and relief of symptoms follows while adhesions (as opposed to bands) are difficult of removal and tend to recur after operation. Chronic appendicitis and cholecystitis are frequent sources of infection. Fluoroscopic examination is necessary for the demonstration of these bands.

Surgery and Cancer.

A. J. OCHSNER discusses cancer from the surgical standpoint (*Journal of Radiology*, November, 1923). He lays stress on the importance of early excision and advises the use of the actual cautery for this purpose combined with radium and X-ray therapy. He thinks that all patients should receive pre-operative radiation, the operation is performed within a week of the patient's recovery from the depression following massive radiation while after operation treatments are given for six to sixteen weeks. The author is not sure whether one massive dose has any advantage over repeated dosage. It is most important that radiation be only undertaken by a competent scientific radiologist, otherwise more harm than good will result.

Pericarditis with Effusion.

FRED M. HODGES (*Journal of Radiology*, October, 1923) draws attention to the X-ray diagnosis of pericarditis with effusion. This condition most frequently occurs as a complication of the acute infective disease especially acute articular rheumatism and pneumonia, but it may occur in the course of any local infection such as empyema. Clinical history is usually vague, but pain and dyspnœa are usually constant; the pain usually subsides when effusion occurs. When the effusion reaches two hundred cubic centimetres there is usually present a friction rub and extension of the cardiac dulness upwards and to the left, susbternal dulness and broadening of the heart shadow. It may also be possible to demonstrate compression of the lung and depression of the left lobe of the liver. X-ray examination shows a general increase in the width of the cardiac shadow, widening of the mediastinal shadow which changes with change in the position of the patient, straightening of the left border of the heart, absence of cardiac pulsations, bulging of the heart shadow up and to the left and extension of the mediastinal borders up to the clavicle. In the absence of effusion X-ray diagnosis is not possible.

Duodenal Regurgitation.

PAUL EISEN writes on the subject of duodenal regurgitation (*Journal of Radiology*, November, 1923). The author has noticed this phenomenon on many occasions in investigating duodenal ulcers. Alvarez states that particularly toward the close of gastric digestion there is normally some regurgitation of duodenal contents into the stomach. In one hundred and ninety patients the authors only noticed regurgitation into the stomach in nine instances. The clinical significance of regurgitation is not known, but slow moving waves pour the duodenal contents back into the stomach. Then phenomenon occurs in many conditions, but is particularly noted in cases of gastric distension over the six-hour period. In gall bladder lesions it is very uncommon.

Ureteral and Renal Calculi.

ARTHUR L. SMITH (*American Journal of Radiology*, April, 1924) discusses the diagnosis of renal and ureteral calculi. He considers that X-ray and cystoscopical examinations should be used in combination in the diagnosis of calculus. A complete physical examination should also be insisted upon. The abdomen generally and the renal tracts in particular are examined by radiographic methods before cystoscopical examinations and later plates are made of the renal tracts with opaque catheters in position and after sodium iodide injection. In some cases a wax-tipped catheter is used. The author considers the many conditions which may be met with in such an examination. Ureteral kinks, tumours of the renal pelvis, hydro-nephrosis and nephroptosis are well displayed by pyelography. In pyelo-nephritis the renal pelvis may not be enlarged. Gall bladder disease and appendicitis are frequently mistaken for renal conditions, but X-ray examination combined with cystoscopy and pyelography should be of great value in differential diagnosis. A series of skiagrams illustrates this article and several pelvic shadows are depicted which have been proved to be outside the renal tract by ureteral catheterization.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the B.M.A. Building, 30-34 Elizabeth Street, Sydney, on June 26, 1924, DR. ANDREW DAVIDSON, the President, in the chair.

Radiation in the Treatment of Cancer.

DR. H. M. MORAN read a paper entitled "Radiation and Cancer" (see page 217).

DR. E. H. MOLESWORTH read a paper entitled "The X-ray Treatment of Cancer of the Breast" (see page 220).

DR. B. J. HARRISON read a paper entitled "The Radiation Method in Cancer Treatment" (see page 222).

DR. T. FIASCHI, D.S.O., in opening the discussion said that he had been impressed by what he had heard from the speakers. They had come to an important point in the treatment of malignant disease and every encouragement should be given to workers in this new field who presented their results in such a clear and fair way as the speakers that night had done. The only bar that he could see was the economic one. The treatment was very expensive and was not available for all classes of the community. Dr. Fiaschi referred to the case of the wife of a working man from whom a malignant cystoma had been removed, with subsequent relapse. One of the speakers had used deep X-ray therapy with definite improvement, but the patient had not been able to continue the treatment. Dr. Fiaschi asked why this treatment could not be carried out at hospitals or, if this were not possible, why did the State not step in and make it available to the poorest people. They had heard from one speaker that the cost of deep X-ray therapy to the practitioner was seven or eight pounds per sitting. When ten guineas was charged for a sitting the operator did not get much for his work. It was important to find out a way by which every chance could be given to the new treatment.

DR. J. G. EDWARDS said that although he confined his work to the diagnostic side of radiology, he was deeply interested in the question of radiation. It was his experience that many practitioners found it difficult to understand deep X-ray therapy. He thought that it could best be explained by the statement that the X-rays produced by the higher voltages were electrically produced radium rays. A patient treated by deep therapy was getting good average radium doses. X-rays could do anythinng that radium could do, except in inaccessible places. It was said that a voltage of one million was obtained from radium, but there was no X-ray tube in existence which would stand up to such a current. The cost was not really excessive. He had prepared an estimate for the Sydney Hospital authorities. The cost would be fifteen pounds per patient and it would be possible to treat two patients a day. It would of course be necessary to pay a medical practitioner an adequate fee to watch the treatment. Such an individual would have to be specially trained, for with an error of 2% patients would be burned. The work was also exceedingly tedious and trying and not without risk to the operator. Dr. Edwards referred to cancer of the stomach and said that he had seen many patients both before and after treatment by deep therapy. In large fungating cancers of the stomach improvement for a time was wonderful, the fungating portion of the tumour was acted on with great rapidity and passage of food through the stomach was permitted. Dr. Edwards also said that although mention had been made of the treatment of malignant disease of the prostate by radiation, nothing had been said about the treatment of simple hypertrophy of that organ by this means. While in Melbourne at the Congress he had seen several patients who had obtained relief from moderate radiation. These old gentlemen were able to sit on a specially constructed chair and read the newspaper while treatment was carried out; he thought it was very satisfactory. He did not think that deep radiation should be undertaken at the hospitals, but at a central cancer research institute. He also discussed the question of massive and divided dosage. In the latter method nausea was not produced so frequently as with the former and those who used the divided method, claimed that the effect on the tumour mass was greater. The best results were produced if radiation was carried out while the cells were undergoing mitosis. With divided dosage a greater number of cells would receive radiation while in a state of mitosis.

DR. GORDON CRAIG said that he would like to endorse Dr. Fiaschi's remarks. So far only the rich or the comparatively rich could afford this form of treatment. It was a principle of the members of the medical profession that their skill and knowledge should be available to all alike and it was a reflection that the poor man could not have the same facilities as the rich. It was an expensive form of treatment and its administration was not a function of a hospital. It should be administered in some central bureau such as a cancer research institute. As to the effects he had had opportunities of observing the progress of growths after irradiation through the cystoscope. In one instance a man had come from Queensland complaining of hæmaturia of long duration. Eventually cystoscopic examination had revealed the presence of a large round ulcer with crater-like centre and raised edges similar to ulcers seen on the lip or tongue. Surgery had been used first; the affected hemisphere of the bladder had been removed and the patient had remained well for eighteen months. Later on a recurrence had taken place and Dr. Molewosrth had irratiated the area. Dr. Craig had watched the effect of the treatment. The edge had gradually become drawn together and a prominence had formed on which epithelium was growing. Further irradiation had been given and a puckered area was present in the situation of the recent ulcer. There was no recurrence. The patient had returned to his home and Dr. Craig said that time alone would show whether the result was permanent or not. The result, however, was encouraging and medical practitioners should keep their minds open in regard to the question. Dr. Craig discussed the influence of radiation on another type of bladder growth. He referred to a large growth on the anterior aspect of the bladder. This had been inoperable. Radiation had been carried out and fourteen days later the surface of the growth had become completely white and necrotic. At the first treatment an 85% dose of rays had been administered. Some irritation had resulted in the skin of the gluteal region. Six weeks after irradiation the slough had all but separated. The patient was still under treatment. Dr. Craig referred to the statement which had been made, that surgeons did not appreciate the value of radiation in the treatment of malignant disease of the breast. In the hospital with which he was connected, routine irradiation was adopted by all surgeons on operated areas. Deep therapy was not used. The treatment was recognized as valuable and good results had been obtained.

DR. LEE BROWN referred to the question of massive and divided doses and said that there was a diversity of opinion in America on the subject. Merritt, of Washington, used massive doses, he occasionally hit the patients very hard and left them in a bad state of collapse. They suffered from nausea, diarrhœa and vomiting, but cures were frequently reported. Geraghty, of the Johns Hopkins Hospital, on the other hand used divided doses. Geraghty had treated carcinomata of the bladder and had assured him (Dr. Lee Brown) that he had obtained cures with an absolutely clean bladder afterwards. He had seen cystocopic evidence of this. The response of different forms of malignant disease to radiation was interesting. Round celled sarcomata responded well, so well that radiation might almost be regarded as a specific in their treatment. Spindle celled sarcomata did not respond so readily. He had seen carcinomata of the bladder and prostate treated by deep therapy alone, but had not seen a single instance in which it could be said with certainty that a cure had resulted. In San Francisco radium was more frequently used for tumours of this nature. Seeds of emanation containing one to one and a half millicuries were implanted in the growth through the cystoscope and in this way encouraging results had been obtained. Crabtree, of Boston, implanted seeds through the cystoscope in such a way as to surround the growth completely; the result was that it sloughed out in one mass. In the New York Cancer

Hospital tubes were inserted into malignant prostates by the tactile sense alone and encouraging results were reported, though no absolute cures had been obtained. Dr. Lee Brown concluded his remarks by saying that in the treatment of malignant disease it was possible to use radical surgery, diathermy, radium or deep X-ray therapy. None of these by itself might be specific, but by a judicious combination satisfactory results should be obtained.

DR. R. I. FURBER, D.S.O., referred to low voltage rays and asked the opinion of the speakers in regard to them. He had seen good palliative results follow their use in cancer of the uterus. Discharge, bleeding and pain disappeared. He asked whether deep therapy had been used with success in malignant disease of the ovary. This was usually a very fatal disease and it was the metastases which killed the patient. Was epithelioma of the vulva following leucoplakia amenable to treatment?

One feature of repeated doses of X-rays was their effect on the peritoneum. The formation of universal adhesions binding bowel to bowel rendered further operative procedures difficult. The adhesions were not very dense, they could often be peeled apart without great difficulty, but sometimes careful dissection was necessary. He had seen this happen after repeated applications of low voltage currents.

DR. R. B. MONSON referred to the fact that every clinic in Germany and Austria was provided with its deep therapy X-ray apparatus. All the poor could obtain the treatment that they desired. Apparently the claim was made that there was no mortality associated with X-ray therapy. Dr. Monson did not think this was the case. He had seen some terrible things in Germany. In one instance he had seen a patient whose sternum had been destroyed. Both lungs had been exposed and the pericardium had been visible. He had asked whether the technique had not been at fault and had been told that there were certain individuals with an idiosyncrasy to X-rays and that in spite of the best technique accidents occurred with these people.

DR. E. M. HUMPHERY said that one of the disadvantages of deep X-ray therapy was the damage to other tissues than those affected by the disease. With radium therapy this did not happen so much. The whole apparatus was undergoing change. Sooner or later it might be possible to use emanations from radio-active substances, possibly they might be collected from deep X-ray machines and stored. In regard to the question of expense it was necessary to remember that changes occurred so rapidly that it was a serious matter for a hospital to put about seven thousand pounds into an apparatus which might soon become obsolete. On the other hand a great deal of money was spent on surgical equipment and instruments and Dr. Humphery thought that it was worth while spending money on one of these machines.

DR. GARNET HALLORAN said that the question of the exfoliation of laryngeal cartilages after irradiation had been dealt with recently in the *Journal of Laryngology*. Exfoliation might be prevented by introducing radium into the intra-laryngeal tumour and subsequently subjecting the secondary glands to deep X-ray therapy. He had adopted these measures in the case of a patient suffering from malignant disease of the larynx referred to in Dr. Moran's paper. He had performed laryngo-fissure after deep tracheotomy and Dr. Morgan had then introduced radium into the hard intra-laryngeal mass. Seven hours later the radium needles had been removed through the cervical incision and the co-aptation sutures tied. The tracheotomy tube had been left in for three weeks to obviate the possibility of œdema of the larynx. The glands had then been irradiated by Dr. Molesworth and the patient would be kept under observation. He thought that in future it would possibly be better to close the laryngeal wound completely at the time and bring up the attachments of the radium needles through the mouth for subsequent removal. Finally, Dr. Halloran referred to the case of sarcoma of the posterior ethmoid, obstructing the choana, which had been mentioned by Dr. Harrison. He said that the condition had cleared up within two weeks of radiation. The patient was still under observation and there had been no recurrence in the previous twelve months.

DR. GEORGE R. HAMILTON referred to the fact that he had given prophylactic doses of X-ray at the London Hospital four years previously, after operative treatment for malignant disease of the breast. Such procedure was adopted as a routine at that hospital, pre-operative doses were also given in many cases as well. This was before the advent of the deep therapy machine. At the Sydney Hospital he used the low voltage machine. He pleaded for a greater combination of effort between surgeons and radiotherapeutists and expressed the hope that the former would give up their prejudice to radiation.

DR. R. P. W. FRANCIS referred to the question of risk to the patient in the treatment of malignant disease of the larynx. Reference had been made to the matter in the journals of laryngology of recent date. Sudden death a few days after radiation from heart failure had been said to be due to the devitalizing effect of the rays. Instances of necrosis of the hyoid bone and distintegration of the laryngeal cartilages had been reported and the general reaction was sometimes manifested in debility which caused great anxiety. Dr. Francis asked whether this effect could be obviated.

DR. T. M. FURBER said that he wished to combat Dr. Harrison's statement that surgery was empiric. He asked in what way the X-ray men escaped this accusation. The essence of empiricism was trial and radium treatment had hardly got beyond the empiric stage. In regard to Dr. Molesworth's statement that surgeons were loath to submit their patients to X-ray treatment, he admitted that surgeons were given to individualism and were wont to work in water tight compartments, but the radiologists were not free from the same faults. He had seen rodent ulcers treated until they were too bad for further radium treatment and then sent on to the surgeon.

Before asking the speakers to reply Dr. Andrew Davidson, the President, thanked the speakers for their papers and said that the discussion had shown how much their remarks were appreciated.

DR. MORAN in reply to the question of the occurrence of a mortality from X-ray therapy thought that there must be a definite mortality especially when heavy doses were given. He had seen patients hurried to their graves by big doses of X-rays, but these individuals were always in a cachectic state. Radiation of the liver was often followed by severe symptoms, this was the reason why cancer of the stomach was not amenable to treatment by deep X-ray therapy. In regard to the appreciation of radiation by surgeons generally he held that this was small; the small attendance of surgeons at the meeting was ample evidence of the measure of their appreciation. He agreed with Dr. Fiaschi in regard to the economic aspect and emphasized again the fact that something could be done with radiation even if in some instances it was only something palliative. He expressed the opinion that the delay in establishing a cancer clinic and the failure on the part of medical practitioners to cooperate in the treatment of malignant disease were a disgrace to Australia.

DR. MOLESWORTH in his reply said that radium could burn as much as X-rays. It was simply a question of dosage. The effect was identical. A difference in effect was a difference in dosage. In regard to the sloughing of the chest wall which had been mentioned by Dr. Monson, he had no doubt that the copper filter had slipped. Sloughing of the chest wall would require an enormous dosage and such an occurrence could only be explained by the slipping of the copper filter. This would allow about nine times the normal dose to be administered. The risks from deep therapy were practically negligible. He had seen a patient die sooner than would otherwise have been the case owing to the administration of a second dose of X-ray too soon after the first dose. Fibrosis of the lungs had been present. There was no perceptible mortality from deep X-ray therapy. Sickness, however, was a very real thing. It was more noticable if the upper portion of the abdomen had been irradiated. It could be avoided in a very large measure. The removal of nitrous oxide from the room was of importance and in any case the sickness soon disappeared. In regard to the provision of radiation for the general public Dr. Molesworth pointed out that a gramme of radium would cost £17,000 and X-ray machines

and appliances would cost another £17,000. Altogether about fifty or one hundred thousand pounds would be required in order to start a clinic. The University was organizing in order to obtain funds and it was time that provision was made for the treatment of the general public. It was time to stop doing the work for nothing, for it cost about six pounds an hour to run the machine in private practice. He hoped that the scheme would receive the support of the medical profession. There was a danger that lack of cohesion would ruin the scheme. It only required one or two men to express doubt about the benefits which would accrue, and subscriptions would not be forthcoming. In conclusion Dr. Molesworth laid stress on the advantages of a central coordinated effort with uniformity of method as compared with work in individual departments.

DR. HARRISON in his reply referred to the question of empiricism. He recalled Dr. Halloran's patient and said that the surgeon's knife would have shown no differentiation between healthy and diseased tissues, the whole lot would have come out. With treatment by radiation the malignant tissue alone disappeared; there was a certain amount of specificity, it was a natural method of treatment. The surgeons removed tissue in an unnatural way.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been elected members of the Victorian Branch of the British Medical Association:

BLANCH, MENA MARGARET, M.B., B.S., 1924 (Univ. Melbourne), Melbourne Hospital, Melbourne.

BOWMAN, BERLY OENONE, M.B., B.S., 1924 (Univ. Melbourne), Melbourne Hospital, Melbourne.

GARRET, BERNARD BALFOUR, M.B., B.S., 1924 (Univ. Melbourne), Coburg.

JOHNSON, RICHARD WILLIAM, M.B., B.S., 1924 (Univ. Melbourne), Melbourne Hospital, Melbourne.

LIEBERT, AMANDA ANNIE GERTRUDE, M.B., B.S., 1924 (Univ. Melbourne), 20, Berkeley Street, Glenferrie.

MACDONALD, ALFRED JAMES, M.B., B.S., 1924 (Univ. Melbourne), Malvern.

Corrigendum.

OUR attention has been drawn to a typographical error in the announcement of the election of Dr. I. McW. Bourke to membership of the Queensland Branch of the British Medical Association. The correct statement is as follows:

BOURKE, ISIDORE MCWILLIAM, M.R.C.S. (Eng.), L.R.C.P. (Lond.), D.P.H. (Lond.), Townsville.

University Intelligence.

THE UNIVERSITY OF SYDNEY.

A MEETING of the Senate of the University of Sydney was held on August 11, 1924.

A letter was received from the Under-Secretary, Department of Education, reporting the award of a Dominion Scholarship at the Imperial College of Science and Technology to Miss Marjorie Collins, M.Sc.

Miss Marjorie I. Collins qualified for entrance to the University by passing the Senior Public Examination in November, 1912. Miss Collins graduated B.Sc. in December, 1915, with first class honours in Botany. She was a Science Research Scholar at this University until 1917 when she was appointed to the position of Demonstrator and Lecturer in Botany at the University of Adelaide. In 1920 she was elected to a Linnean Macleay Fellowship in Botany at the University of Sydney which she at present holds. In March, 1924, Miss Collins qualified for the degree of Master of Science in Botany gaining first class honours and the University Medal.

A portrait of Sir Alexander MacCormick by Miss Florence Rodway was offered to the University by Dr. McMaster on behalf of a medical committee, in order that it might be placed in the Medical School where Sir Alexander MacCormick was for so many years lecturer in surgery. It was resolved to accept the gift and send a letter of thanks to the donors.

Medical Societies.

THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA

A MEETING OF THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA was held at the University of Adelaide on June 6, 1924.

X-Radiation in Fibrosis.

DR. W. RAY stated that some ten or twelve years previously Lazarus Barlow had drawn attention to the possibility of removing deep-seated fibrous tissues by X-radiation and suggested especially that this mode of treatment might be employed for adhesions of all types and also for the treatment of cardiac fibrosis. Dr. Ray had followed up his suggestion, preceding the radiation by the administration of potassium iodide and administering about three-quarters of the dose of X-radiation which would be required to give rise to erythema. In several cases remarkable improvement of cardiac efficiency had been noted and stenotic lesions had been sufficiently softened to permit a return of functional capability. A remarkable feature was the disappearance of pain and discomfort. It might be suggested that this effect was purely anæsthetic, but the gain in well being consequent upon the increase of the comfort of the patient justified the continuation of experiments in this direction.

DR. C. T. C. DE CRESPIGNY inquired whether this method had been employed in any cases of syphilis or rheumatism. Dr. Ray stated that in none of the patients whom he had investigated, had there been any evidence of syphilis. DR. A. A. LENDON inquired whether this treatment had been employed in angina. Dr. Ray stated that it had not yet been employed in such cases. PROFESSOR J. B. CLELAND asked whether the treatment had been employed without previous administration of iodides. Dr. Ray stated that the radiation without iodides had not been employed.

Immunity from Shock.

MR. R. H. MARSTON demonstrated the effect of increasing the dead space in respiration in conferring a certain degree of immunity from shock induced in rabbits by administration of histamine. He exhibited a valve which could be placed in the trachea, by means of which inspiration occurred through the ether bottle and expiration into the open air. The use of the valve had at first involved a considerable increase in the normal volume of the dead space with a result that it proved almost impossible to elicit shock by administration of histamine. By constructing the valve on a greatly reduced scale it was possible to maintain the normal proportion of dead space in respiration with the result that this immunity was avoided. The results suggested that an increase of carbon dioxide tension in the alveolar air conferred a certain degree of immunity from shock.

DR. G. BROWN pointed out that a mixture of 10% carbon dioxide and 90% of oxygen had frequently been used to bring about the recovery of patients from shock after operation. The results reported appeared to be very good.

Actinomycosis.

DR. C. T. C. DE CRESPIGNY reported a case of actinomycosis in a girl of twenty years, a patient of Dr. Souter, of Strathalbyn. A swelling on the inner aspect of the left leg had been thought to be a hæmatoma. A blood clot was discharged containing typical sulphur granules. This led to the diagnosis of actinomycosis. Later the process involved the brain. When the patient was admitted

to hospital a discharging opening was found opposite the left internal malleolus from which pus was obtained. A pure culture of actinomycosis was obtained. The cerebral condition increased, leading to hemiplegia on the right side and the patient ultimately died. At the *post mortem* examination an abscess was found in the left frontal lobe. In the right lung a focus five centimetres in diameter was connected by adhesion to the diaphragm and the liver was adherent. A single hydatid cyst was also found in the liver.

DR. L. B. BULL reported that pure cultures of *Streptothrix actinomyces* had been obtained from the discharging opening in the leg and also from the abscess in the brain. These cultures were grown under anaerobic conditions. There might be slight growth under aerobic conditions after incubation over a long period. It was believed that the same actinomyces produced the disease in man and cattle. The first full description of the organism had been given by Bostrum in 1890. He had obtained only twelve colonies of growth in seven hundred tubes taken from eleven cases of actinomycosis of the jaw of cattle. The organism was grown under aerobic conditions and grew well at room temperature as well as at 37° C.. In 1891 Wolff and Israel had isolated an anaerobic organism from two patients. Their work had received little attention until Wright obtained, in 1905, an organism which was essentially an anaerobe in thirteen cases of human actinomycosis and two of the bovine disease. Wright had suggested that the normal habitat of the anaerobic organism was the alimentary canal. Mainly on account of its being an anaerobe Wright considered it unlikely that it was introduced on foreign bodies. When the ease with which strict anaerobic organisms could grow in symbiosis with other organisms in the presence of oxygen under natural conditions was considered, the fact of its anaerobic properties could not be accepted as evidence against the probable wide distribution of the actinomyces on vegetable matter.

DR. RAY inquired whether there were many reports of actinomycosis infections in the brain? Dr. Bull stated that there were many reports of abscesses in the central nervous system, but not many of metastatic abscesses in the brain. When meningitis occurred it was usually by direct extension. In the present case the primary lesion might have been that seen in the lung, but there was no clinical evidence to establish the fact.

DR. W. R. CAVANAGH MAINWARING reported a case of liver tumour originally supposed to be either tuberculous, syphilitic or actinomycotic. The tumour had been found to consist mainly of fibrous tissue. There was no tuberculosis and no Wassermann reaction had been obtained. The fibrous tissue had been cut away and the wound drained and this had been repeated on a second and a third occasion, by which time *Streptothrix actinomyces* had been discovered microscopically and the tumour had extended into the liver. X-ray therapy had been employed and a considerable amount of improvement had occurred. The tumour was progressively getting smaller, but the patient still continued to display an occasional rise of temperature and rigor.

A MEETING OF THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA was held at the University of Adelaide on July 4, 1924.

Infantile Tuberculosis.

DR. R. L. T. GRANT exhibited three specimens as follows: (i.) A good example of a well-formed "cobweb" in the cerebro-spinal fluid from a patient with pneumococcal meningitis. (ii.) The organs from a child who died of acute lymphatic leuchæmia, showing infiltration of the lymphoid patches in the intestine, an enlarged spleen, greatly enlarged mesenteric glands and infiltrated enlarged tonsils. (iii.) The organs from an infant who died of acute generalized tuberculosis. The child's mother had died of pulmonary tuberculosis shortly after delivery. The lesions in this infant were exhibited as examples of congenital tuberculosis.

A discussion followed as to the origin of the infection of the infant with tuberculosis.

DR. L. B. BULL suggested that infection might have occurred through swallowing by the infant of amniotic fluid, thus infecting the alimentary canal. He stated that similar phenomena had been observed in the calf.

Microscopical Work.

MR. G. SAMUEL exhibited a point source of light especially adapted for photo-micrographic work.

Gastric Ulcer.

PROFESSOR J. B. CLELAND exhibited the stomach of a male demented patient, aged forty-eight years. Four large subacute gastric ulcers were present along the lesser curvature. From one of these an extensive hæmorrhage had occurred which was probably the cause of death. What was of special interest was that near one of the ulcers there was a separate small circular area, about six millimetres in diameter, in which apparently the mucosa had undergone coagulation necrosis. The centre of the patch was somewhat hæmorrhagic. Another similar but less distinct patch was also present. The degeneration appeared to be superficial in extent, not invading the deeper coats. It suggested the result of infarction. As the patient had mitral stenosis, a friable *ante mortem* clot in the left auricular appendix and infarcts in the right lung, it was possible that infarction might explain the necrosed patches. No infarcts, however, had been detected in any of the other organs supplied by the systemic circulation and Profesor Cleland thought that it would be singular if they were confined to this one situation, the stomach. It was possible, however, that minute infarcts had occurred elsewhere, but the collateral circulation had been sufficient to prevent death of the tissues. These necrosed patches suggested that they were the forerunners of gastric ulcers in this patient and that the four large ulcers might have arisen in this way by the subsequent digestion of the dead tissue by the gastric juice. In another autopsy at the Adelaide Hospital a few days later another small superficial necrosed patch of gastric mucosa had been seen, without the presence of any ulcers or any cause for infarction.

Leuco-Compounds.

MR. R. H. MARSTON pointed out that all proteolytic enzymes were precipitated from their solutions by azine dyes and that these dyes also stained and therefore presumably combined with substances contained in the mitochondria, leaving the rest of the tissue unstained. In the course of time the original green colour changed to red, indicating partial reduction of the dye-stuff. Ultimately the colour disappeared, indicating a further stage of the reduction and the production of the leuco-compound.

He demonstrated the formation of the leuco-compound from Janus-green through the action of hydrogen. Once having been stained with Janus-green, notwithstanding the fact that they subsequently became colourless, they could again be stained with any azine dye, indicating that the leuco-compound was still held combined in the mitochondria. He suggested that mitochondria which were known to contain abundance of lipoids, constituted a water-free phase at the surface of which proteolytic enzymes accomplished synthesis of proteins. The same enzymes discharged from the mitochondria and issuing into an aqueous fluid, as in the digestive fluids, would then be acting in the presence of excesss of water and become hydrolysing agents.

PROFESSOR T. BRAILSFORD ROBERTSON pointed out that the synthesis of protein from its digestion products had been accomplished by means of proteolytic enzymes acting upon highly concentrated mixtures of the products of digestion, but that the slowness of reversion and incompleteness of the yield indicated that rapid and complete synthesis, such as occurred in living cells, could only take place in a virtually water-free system.

MR. J. G. WOOD drew attention to the recent work of Priestley showing that in meristematic tissue in plants protein and lipoid synthesis was very rapid. The cells comprising this tissue contained mitochondria. On the other hand reversion of lipoid synthesis occurred in vacuolated cells in which mitochondria were scanty.

Correspondence.

THE WALTER AND ELIZA HALL RESEARCH INSTITUTE, MELBOURNE.

SIR: Owing to the generosity of the Edward Wilson Trustees who have just given us £3,000 for the purpose, we are at last able to form a small working library. Up to the present time all that we have had, has been a small collection of the late Dr. C. G. M. Mathison's private books and journals together with some two or three journals to which we have subscribed regularly. Some members of the medical profession have already been very generous to us and one Melbourne doctor has given us a good many of the back numbers of the *Archives of Internal Medicine*, of the *Quarterly Journal of Medicine* and of *Heart*. If any other members of the profession feel inclined to follow this generous example, we would be very glad to hear from them. We are particularly anxious for old numbers of *The Lancet*, *The British Medical Journal*, *The Journal of the American Medical Association* and *Medical Science Abstracts and Reviews*, but any other journals valuable for reference purposes will be welcome.

We should be glad if anyone who is willing to help us in this way, would communicate with us in the first instance, stating exactly what numbers they are able to give us, in order to avoid overlapping.

Yours, etc.,

CHARLES H. KELLAWAY.

Director, Walter and Eliza Hall Research Institute, Melbourne, Hospital.

August 11, 1924.

Obituary.

HUGH MILLER ANDERSON.

IT is with regret that we announce the death of Dr. Hugh Miller Anderson which occurred at Cootamundra, New South Wales, on August 18, 1924.

DAVID RICHARD EDWARDS.

WE regret to announce the death of Dr. David Richard Edwards which occurred at Sydney on August 19, 1924.

Books Received.

GUIDE TO PORTEUS MAZE TEST, by S. D. Porteus; 1924. Vineland, N.J.: The Training School; Post 8vo., pp. 35, with diagrams.

MEDICAL AND SANITRY INSPECTION OF SCHOOLS, by S. W. Newmayer, A.B., M.D.; 1924. Philadelphia and New York: Lea and Febiger; Post 8vo., pp. 462, with 79 engravings and six plates. Price: $4.00.

A DIABETIC MANUAL FOR THE MUTUAL USE OF DOCTOR AND PATIENT, by Elliott P. Joslin, M.D.; Third Edition, thoroughly revised; 1924. Philadelphia and New York: Lea and Febiger; Post 8vo. pp. 211, illustrated. Price: $2.00.

CLINICAL ASPECTS OF THE ELECTROCARDIOGRAM, by Harold E. B. Pardee, M.D.; 1924. New York: Paul B. Hoeber, Inc.; Demy 8vo., pp. 222, with 56 illustrations. Price: $4.00.

Medical Appointments.

DR. ROBERT DICK (B.M.A.), Director-General of Public Health, New South Wales, has been appointed to rank as Permanent Head of the Office of the Director-General of Public Health.

* * * *

DR. ROBERT MAXWELL MCMASTER, D.S.O. (B.M.A.), has been appointed Senior Medical Officer, Coast Hospital, Office of the Director-General of Public Health, New South Wales.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C..

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
VICTORIA: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited Mutual National Provident Club. National Provident Association.
QUEENSLAND: Honorary Secretary, B. M. A. Building, Adelaide Street, Brisbane.	Brisbane United Friendly Society Institute. Stannary Hills Hospital.
SOUTH AUSTRALIA: Honorary Secretary, 12, North Terrace, Adelaide.	Contract Practice Appointments at Renmark. Contract Practice Appointments in South Australia.
WESTERN AUSTRALIA: Honorary Secretary, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Diary for the Month.

AUG. 31.—Victorian Branch, B.M.A.: Notice *re* Election.
SEP. 3.—Victorian Branch, B.M.A.: Branch.
SEP. 5.—Queensland Branch, B.M.A.: Branch.
SEP. 9.—New South Wales Branch, B.M.A.: Ethics Committee.
SEP. 10.—Tasmanian Branch, B.M.A.: Branch.
SEP. 10.—Central Northern Medical Association, New South Wales.
SEP. 10.—Melbourne Pædiatric Society.
SEP. 11.—New South Wales Branch, B.M.A.: Clinical Meeting.
SEP. 11.—Victorian Branch, B.M.A.: Council.
SEP. 11.—South Australian Branch, B.M.A.: Council.
SEP. 11.—Brisbane Hospital for Sick Children: Clinical Meeting.
SEP. 12.—Queensland Branch, B.M.A.: Council.
SEP. 12.—Central Southern Medical Association (Goulburn), New South Wales.
SEP. 16.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
SEP. 17.—Western Australian Branch, B.M.A.: Branch.
SEP. 17.—South Sydney Medical Association, New South Wales.
SEP. 19.—South Eastern Medical Association (Wollongong), New South Wales.
SEP. 20.—Northern Districts Medical Association, New South Wales.

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